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ABSTRACT

This study was conducted to identify information about Acquired Immune Deficiency Syndrome (AIDS) that educators should know to effectively teach about the disease in the classroom. The references identified were divided into seven major categories: (1) current scientific research concerned with the virus that causes AIDS; (2) the effects of the AIDS virus on its victim; (3) modes by which AIDS can be transmitted; (4) current studies concerned with the prevention of AIDS and control of the AIDS epidemic; (5) statistics concerned with the spread of AIDS in the United States and, more specifically, within Indiana; (6) common misconceptions and the apprehension that exists in society; and (7) the need for public and institutional education about AIDS. The literature review indicated that if teachers are to effectively teach students about AIDS in the classroom they need to know the biological nature of the virus, the specific modes by which it can be transmitted, and the means that can be used to prevent the transmission of the disease. (TW)

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An Annotated Bibliography About AIDS for Educators of the Life Sciences

By

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Study Directed By

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Submitted in partial fulfillment of the requirements

of S591 Research: Exit Project

Indiana University at South Bend

June 11, 1987

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BACKGROUND

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RATIONALE: The study of AIDS was selected because it is a relatively new topic in the life sciences. It has become evident that information about AIDS needs to be presented in the appropriate courses of public schools by teachers who have enough knowledge about AIDS to objectively cover the related issues thoroughly. Students have raised question about AIDS and teachers can only ponder their responses. The information and recommendations provided by this study will better prepare the author and other educators of the life sciences with adequate information to present AIDS and carry out full discussions on the matter with students. This research will indirectly provide Fairfield High School students in life science courses important information about AIDS that may one day literally save their lives.

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INTRODUCTION

Experts and health organizations are calling upon educators to inform students about acquired immunodeficiency syndrome (AIDS) (Koop:3-6; Centers for Disease Control 34:517-521). If educators are to teach about AIDS, they need to know the "biological nature" of the virus that causes the disease (Bardell:75). Research efforts have been very successful in learning the complexities of the virus that causes AIDS, and much is known about its life cycle as it infects the immune system (See Appendix A:74). AIDS continues to spread throughout the United States, and the number of deaths from the disease continue to increase (See Appendix B:75). The number of reported cases of AIDS in the United States since the discovery of the disease in 1981 has doubled about every 6 to 8 months (See Appendix C:76). States far removed from major cities are reporting more cases of AIDS. Indiana, for example, has reported 84 deaths from AIDS as of 1986 (See Appendix D:77).

The continued spread of AIDS has created foreboding apprehension about the deadly disease throughout much of society (Hellman:284-290). The public must be informed about AIDS to eliminate some of the unfounded fears and anxieties about the disease, and to control what has become an epidemic spread of the disease (Koop:6). Health education offered in the public school has proven to be effective in educating youth about health issues, and it seems to be a good place to educate youth about AIDS (See Appendix E:78). Many innovative curriculums for teaching about AIDS have been developed by various organizations to provide effective resources to help teachers present AIDS in the classroom (See Appendix F:79).

Educators must strive to keep abreast of the issues surrounding AIDS to maintain a high level of competence in teaching the subject to students in the classroom.

STATEMENT OF PROBLEM AND PURPOSE OF STUDY

Acquired immunodeficiency syndrome has continued to spread throughout society. Despite tremendous amounts of research on the disease and the virus that causes it, there is still no cure for it. Because of this, a strong desire exists throughout society for information about the preventative measures to avoid the disease. Increasingly, educators are being asked to present information about AIDS in the classroom.

This study was conducted to identify the most important information about AIDS that educators should know to effectively teach about the disease in the classroom. The information and recommendations provided to educators by this study are intended to improve the quality of teaching about AIDS in the life science courses offered by public schools.

ORGANIZATION OF THE STUDY

The researched material was divided into seven major categories. Some of the research overlapped, but the main ideas were categorized into the area which seemed most appropriate.

The first major category reviewed current scientific research concerned with the virus that causes acquired immunodeficiency syndrome (AIDS). The classification of the virus was discussed in this section of the study. Recent scientific research concerned with the structure and life cycle of the virus was examined in the first part of this study.

The second major category examined the effects of the AIDS virus on its victim. Studies that examined immune deficiency were discussed, and recent scientific studies concerned with the method by which the virus causes AIDS were reviewed. The common symptoms and visible signs typical of AIDS victims were also identified in this portion of the study.

The third major category dealt with the modes by which AIDS can be transmitted. Current research was examined, and the known modes of transmission were discussed in this section of the study. Modes by which the virus may not be transmitted were also discussed in this portion of the study.

Current studies concerned with the prevention of AIDS and control of the AIDS epidemic were reviewed in the fourth major category of the study. The educational needs of students and the general public concerning the preventative measures against AIDS were discussed. Various health agency recommendations for preventing the transmission of AIDS during sex, in the workplace, and in schools were examined. Recent scientific research concerned with the development of effective vaccines and drugs for treat-

ment against AIDS was examined and included in this section of the study as well.

The fifth major category reviewed statistics concerned with the spread of AIDS in the United States and Indiana. Recent statistical studies conducted by governmental agencies concerned with the spread of AIDS throughout society were examined in this portion of the study. Projections of the spread of AIDS in years to come were also examined in this section of the study.

The sixth major category dealt with the common misconceptions and the apprehension that exist in society. The educational needs of society for accurate information about AIDS were discussed in this portion of the study.

The final section of the study dealt with the need for wholesale public and institutional education about AIDS. Recent recommendations made by the scientific community, as well as world, national, state, and local health authorities that call for mass education about AIDS were examined. Specific issues surrounding AIDS that had been recommended by health authorities to be included in efforts to properly educate students and the general public about AIDS were examined in this section of the study.

The seven major categories were arranged according to the logical development of the study. Within each sub-category, the annotations were arranged according to the logical development of the argument.

LIMITATIONS OF THE STUDY

Acquired immunodeficiency syndrome (AIDS) is a contemporary phenomenon. As ongoing scientific research on AIDS continues and new facts are learned, ideas about the nature of the virus and the disease may change. Even the most recent material concerned with AIDS analyzed in this study is subject to change.

This study attempted to summarize the current state of knowledge about AIDS within the last two years. A problem with the proper identification of the virus that causes AIDS was encountered. In the spring of 1986, the scientific community agreed to assign the generic name human immunodeficiency virus (HIV) to the virus that causes AIDS (Rhine:3). Prior to the spring of 1986, and dependant upon the laboratory the virus was studied in, the virus had been called any of the following: human T-lymphotropic virus (HTLV), human T-cell leukemia virus type III (HTLV-III), lymphadenopathy-associated virus (LAV), AIDS-related virus (ARV), and so forth. Some literature written after the spring of 1986 had failed to use the proper assigned name, HIV. In this study, it was decided that the various names used by the authors would remain unchanged in the annotations. The proper generic name, HIV, will be used in the rest of the study. Acquired immunodeficiency syndrome is referred to as AIDS throughout this study. A review of the literature indicated that using the acronym AIDS alone when referring to the disease is proper.

The information reported in this study is mainly intended to benefit secondary educators in the life sciences. A glossary has been included to define various terms encountered in the literature and used in this study. The intent of this study is to provide adequate background research data to enhance the teacher's understanding of AIDS, not to provide enough information to make the teacher, or the author, an expert.

DEFINITION OF TERMS

Absolute Lymphopenia-- "A deficiency of lymphocytes in the blood " (Taber: L-60).

Acquired Immunodeficiency Syndrome or Acquired Immune Deficiency Syndrome-- "A severe late manifestation of infection with the HIV....The virus destroys important components of the human immune system....Persons with the disease develop infections caused by microorganisms that usually do not produce infections in persons with normal immunity " (Institute of Medicine/National Academy of Sciences [IOM-NAS]: 191).

AIDS-Related Complex (ARC)-- "A variety of chronic symptoms...that occur in some persons who are infected with HIV, but whose conditions do not meet the Centers for Disease Control's definition of AIDS.... Symptoms may include swollen glands, recurrent fever, weight loss, diarrhea, lethargy...and oral thrush. ARC may not develop into AIDS," (IOM-NAS: 191). "...now called HIV " (Rhine: 3).

AIDS Virus-- "name given to the virus that causes AIDS...now called HIV " (Rhine: 3).

Alveoli-- "Air cells of the lungs " (Taber: A-60).

Anorexia-- "Loss of appetite... brought on by malaise, fevers, and illnesses" (Taber: A-191).

Antibody-- "Protein substances developed by the body...in response to the presence of an antigen" (Taber: A-91).

Anti-Viral Agents-- "Any substance which can inhibit a virus" (Taber: A-102).

AIDS-Related Virus or ARV-- "...name given to the virus that causes AIDS by UCLA researchers who isolated it in 1981" (IOM-NAS: 191). "...now called HIV" (Rhine: 3).

Aspergillosis-- "A fungal infection of tissues or of any mucous surface" (Taber: A-131).

B-Cells-- "...one of two classes of white blood cells....B-cells are the source of antibodies....When a B-cell recognizes an antigen... it becomes activated" (Laurence: 86).

Blastogenesis-- "Multiplication by budding" (Taber: B-36).

Blood-Clotting Factor-- "Any substance derived from blood which causes clotting" (Taber: B-42).

Bud or Budding-- "...a small protruberance or outgrowth which results in the formation of a new structure" (Taber B-67).

Candidiasis-- "An infection of the skin or mucous membrane with any species of the Candida fungi" (Taber: C-11).

Capsid-- "The protein covering around the central core of a virus paricle" (Taber: C-13).

Carrier-- "A person who harbors a specific pathogenic organism in the absence of symptoms of the disease and who is capable of spreading the disease to others" (Taber: C-23).

Chromosome-- "...microscopic body which develops from the nuclear material of a cell... contains genes or hereditary determiners" (Taber: C-68).

Clinical Symptoms-- "...actual observation and treatment of patients... after diagnosis of apparent affliction" (Taber: T-14).

Complementary Strand of DNA-- "A duplicate DNA strand formed from a template" (Taber:T-14).

Cryptococcossis-- "...opportunistic infection caused by the yeastlike fungi Cryptococcus neoformans" (Farthing: 6).

Cryptosporidiosis-- "...opportunistic infection caused by protozoans of the family Cryptosporidia that causes severe chronic diarrhea" (IOM-NAS: 192).

Cytomegalovirus Infections-- "A severe congenital infection of infants... and patients who had undergone bone marrow transplants...rarely causes disease in healthy adults....In AIDS patients it may produce pneumonia, inflammation of the retina, liver, kidneys, and colon" (IOM-NAS: 192).

Dermatalogical-- "infections related to the skin" (Taber: D-19).

Double Stranded DNA-- "...copied from single-stranded viral RNA...it migrates into the cell nucleus... forms a circle and then inserts itself into the host cell DNA...there it is called a provirus" (IOM-NAS: 192).

DNA-- "A nucleic acid found chiefly in the nucleus of living cells that is responsible for transmitting hereditary characteristics" (IOM-NAS: 192).

DNA polymerase-- "...enzyme joining nucleotides together to form a DNA strand" (Tortora: 213).

Emesis-- "Vomiting" (Taber: E-21).

Envelope-- "A membrane...made of two layers of lipid (fatty) material, forming the outer covering of a virus" (Gallo: 48).

Enzyme-- "An organic catalyst produced by living cells... made of complex proteins" (Taber: E-41).

Epidemic-- "The appearance of an infectious disease or condition which attacks many people at the same time in the same geographical area" (Taber: E-44).

Epidemiology-- "...defining and explaining the interrelationships of the host, agent, and environment in causing disease" (Taber: E-44).

Esophagitis-- "The inflammation of the esophagus" (Taber:E-58).

Etiological-- "...Cause or causes of disease" (Taber: E-62).

Etiology-- "The study of the causes of disease" (Taber: E-62).

Exudate-- "...passing out of pus, serum, or other matter" (Taber: E-72).

Gastrointestinal-- "...pertaining to stomach and intestine" (Taber: G-13).

Gene Code-- "... sequence of nucleotides in DNA that codes for a functional product" (Tortora: 780).

Genome-- "The genetic endowment of an organism" (IOM-NAS: 193).

Helminthic-- "...pertaining to worms" (Taber: H-20).

Helper/Suppressor Ratio-- "Ratio of T cell types....T4 (also called T helper cells) induce other cells to mount an immune defense...T8 (also called T suppressor cells) destroy infected material and shut down the immune response....normal ratio is 2:1" (Laurence: 86).

Hemophilia-- "hereditary blood disease... blood fails to clot and abnormal bleeding occurs"(Taber: H-40).

Herpes-- "...caused by the herpes virus... results in formation of rash, open sores, or blisters" (Taber: H-40).

Herpes simplex virus-- "infectious virus causing herpes" (Taber: H-40).

HIV or Human Immunodeficiency virus-- "...generic name...given by the Scientific community in 1986 to designate the virus causing AIDS" (Rhine: 3).

Host Cell-- "The cell which a parasite obtains its nourishment" (Taber: H-57).

HTLV-III-- "The name given by researchers at the National Cancer Institute to the retrovirus that causes AIDS" (IOM-NAS: 193). "...now called HIV" (Rhine: 3).

Human T-cell Leukemia Virus, Type III, or Human T-cell Lymphotropic Virus, Type III, or HTLV-III-- "The name given by researchers at the National Cancer Institute to the retrovirus that causes AIDS" (IOM-NAS: 193). "...now called HIV" (Rhine: 3).

Immune Deficiency or Immunodeficiency-- "...reduced resistance to diseases" (IOM-NAS: 193).

Immune System-- "The natural system of defense mechanisms in which specialized cells and proteins in the blood and other body fluids work together to eliminate disease-producing microorganisms and other foreign substances" (IOM-NAS: 193).

Immunopathologies-- "...tissue alterations that result from immune or allergic reactions" (Taber: I-9).

Immunosuppression or Immune Deficiency-- "...prevention of the formation of immune response" (Taber: I-9).

In-Vitro-- "...in glass... done in a laboratory" (Taber: I-45).

In-Vivo-- "...in the living body or organism" (Taber: I-46).

Kaposi's Sarcoma or KS-- "vascular (pertaining to blood vessels) tumor, previously seen largely in elderly patients of Mediterranean and Jewish stock....The second most common presentation of AIDS after pneumonia" (Farthing: 24).

Lymphadenopathy-Associated Virus or LAV-- "name given by French researchers to the first reported isolate of the retrovirus known to cause AIDS" (IOM-NAS: 195). "...now called HIV" (Rhine: 3).

Leukoencephalopathy-- "The inflammation of the white matter of the brain" (Taber: L-30).

Leukonemia-- "...lowered white blood cell production" (Taber: L-28).

Leukoplakia-- "The formation of white patches on the mucous membrane of the tongue and cheek...lesion may become malignant" (Taber: L-30).

Lipid-- "...any one of a group of fats or fatlike substances" (Taber: L-40).

Lymph-- "The clear, transparent, alkaline fluids which are products of digestion found in the lymphatic vessels....Lumphatic vessels are microscopic and carry lymph to the blood vessels" (Taber: L-58).

Lymph Node-- "...one of the rounded masses of lymphoid tissue surrounded by a capsule of connective tissue that occur in association with the lymphatic vessels...cells that flow through the node in lymph become lymphocytes" (Websters: 680).

Lymphadenopathy Syndrome or Lymphadenopathy-- "A condition characterized by persistent generalized swollen glands in the absence of any current illness or drug use known to cause such symptoms" (IOM-NAS: 194).

Lymphoma-- "A general term for growth of new tissue in the lymphatic system" (Taber: L-60).

Malaise-- "Discomfort, uneasiness... indicative of infection" (Taber: M-5).

Microbe-- "A minute one-celled form of life" (Taber: M-45).

Mucocutaneus-- "Concerning mucous membrane and skin..." (Taber: M-66).

Neurologic-- "...pertaining to nervous diseases" (Taber: N-23).

Nitrate Inhalents or Poppers-- "A salt of nitrate...suitable for inhaling" (Taber: N-31, I-27).

Nodules-- "...a small node...a small aggregation of cells" (Taber: N-33).

Opportunistic Disease-- "...infections caused by a microorganism that rarely causes disease in persons with normal defense mechanisms" (IOM-NAS: 195).

Pandemic-- "...a disease affecting the majority of the population of a large region, or which is epidemic at the same time in many parts of the world" (Taber: P-13).

Papoviruses-- "...a group of viruses used in investigation of viral carcinogenesis" (Taber: P-13).

Pathogens-- "...a microorganism or substance capable of producing a disease" (Taber: P-33).

Perenteral-- "...occuring outside of the intestines" (Taber: P-27).

Perinatal-- "...occuring in the period preceeding, during, or after birth" (Taber: P-50).

Plasma-- "The liquid part of the lymph and of the blood" (Taber: P-90).

Plasma Cells-- "Cells found in bone marrow and loose connective tissue" (Taber: P-90).

Pneumocystic pneumonia or Pneumocystis carinii pneumonia or PCP-- "The most common life-threatening opportunistic infection diagnosed in AIDS patients... caused by the parsitic protozoan... Pneumocystis carinii" (IOM-NAS: 195).

Progeny-- "...offspring" (Taber: P-143).

Protozoal-- "...pertaining to protozoa" (Taber: P-152).

Provirus-- "A copy of the genetic information of an animal virus that is integrated into the DNA of an infected cell. Copies of the provirus are passed on to each of the infected cell's daughter cells" (IOM-NAS: 195).

Retroviradae-- "...family of viruses... use reverse transcriptase to synthesize proteins" (Rhine:3).

Reverse Transcribed-- "Use of RNA and reverse transcriptase to form an RNA-DNA molecule" (Bardell:76).

RNA-- "A nucleic acid associated with the control of chemical activities inside a cell...some viruses carry RNA instead of the more familiar genetic material DNA" (IOM-NAS: 195).

RNA-DNA Hybrid Template-- "...used to form a complementary strand of DNA... the template is formed by reverse transcription of viral RNA" (Bardell: 76).

RNA Polymerase-- "...an enzyme used in transcription of DNA" (Tortora: 218).

Serum-- "The watery portion of the blood...a fluid found when clotted blood is left standing...it consists of plasma minus the fibrinogen" (Taber: S-37).

Serum Globulins-- "A protein found in blood serum..., fraction of blood associated with antibodies" (Taber: S-37, G-29).

Sporozoan-- "...pertaining to sporozoa... protozoa which includes a miscellaneous assortment of organisms which are parasitic" (Taber: S-87).

STLV-III or Simian T-Lymphtropic Virus, Type III-- "...believed to be the ancestor of the AIDS virus...commonly found in green monkeys... isolated in 1985... nonpathogenic in green monkeys" (Gallo: 55).

Strongyloidosis-- "...protozoal infection...causing pneumonia, central nervous system infection, or infection disseminated beyond the gastrointestinal tract" (IOM-NAS: 150).

T Cells or T Lymphocytes-- "A white blood cell that matures in the thymus gland... subsets of T cells have a variety of specialized functions in the immune system" (IOM-NAS: 196).

T4 Cell, T Helper Cell, T4 White Blood Cell, or T4 Lymphocyte-- "A subset of T cells that act as master regulators of the human immune system. These cells appear to be the primary targets of the HIV" (IOM-NAS: 196).

Template-- "A pattern, mold, or form used as a guide in duplicating a shape, structure, or device" (Taber: T-14).

Thrombocytopenia-- "abnormal decrease in blood platelets" (Taber:T-36).

Thrush-- "fungus infection of mouth or throat" (Taber:T-38).

Toxoplasmosis-- "A disease due to infection with the protozoa, Toxoplasma gondii" (Taber: T-55).

Transcription-- "...in synthesizing genes and proteins, the necessary process of duplication or copying of information from certain aspects of DNA" (Taber: T-59).

White Blood Cell-- "...are central to the immune response...the lymphocytes are white blood cells that fall into two classes: B cells... and T cells" (Laurence: 86).

Yeast Infection-- "An infection caused by any of several unicellular fungi which produce by budding" (Taber: Y-1).

ANNOTATIONS

AIDS: THE VIRUS

Naming the virus HIV

Gallo, Robert C., "French-American Accord: Chronology of Events in Discovery of AIDS Virus," The Chronicle of Higher Education, 33:30:1-9, April 8, 1987.

Gallo explained that scientists from the United States and France had met to agree upon a common name by which the AIDS virus should be called. Gallo reported that his collaborators at the laboratory of tumor-cell biology at the National Cancer Institute in the United States had been calling the virus human T-lymphotropic virus, type III (HTLV-III). Gallo noted that Dr. Montagnier and his collaborators at the Pasteur Institute in France had been naming the virus lymphadenopathy-associated virus (LAV), because the first patient from which the virus was isolated had lymphadenapathy syndrome. The U.S. Department of Health and Human Services named the virus HTLV-III/LAV to recognize scientists from both countries. Gallo mentioned some of the many other names that had been given to the virus by other various researchers throughout the world.

Gallo reported that it was decided by the scientific community to give the virus causing AIDS the generic name human immunodeficiency virus (HIV). Gallo concluded with a brief chronology that summarized the key events and discoveries that led to the discovery of the AIDS virus and its effects on humans in 1981.

Wheeler, David L., "U.S. France End Dispute of AIDS Virus," The Chronicle of Higher Education, 33:30:1-9, April 8, 1987.

Wheeler reported that France and the U.S. had announced that a "bitter scientific dispute" between researchers from both countries over credit for the discovery of the AIDS virus and subsequent patent rights was finally resolved in the spring of 1986. Wheeler indicated that the dispute began when Dr. Robert C. Gallo, chief of the tumor-cell laboratory at the National Cancer Institute of the U.S., and Luc Mongnier, chief of the virology department at the Pasteur institute in France, both filed for a patent for an antibody to the AIDS virus test kit in the U.S.. Mongnier filed first in the U.S.; he was followed shortly after by Gallo. Gallo received a patent for the kit and Mongnier did not. Wheeler explained that Mongnier then accused Gallo of "improperly using samples of the AIDS virus that the French researchers had given to him for comparison tests."

According to Wheeler, the dispute was settled with an agreement to set up a cooperative non-profit foundation to receive 80% of the patent royalties from the test kit sales. Most of this money, according to Wheeler, would be used for grants to be given to any scientist in the world doing research into any of the following areas: (1) the cause of AIDS, (2) the detection of AIDS, (3) treatment of AIDS, and (4) finding a cure for AIDS. Wheeler reported that it was also decided to recognize scientists from both countries by naming the virus human immunodeficiency virus (HIV).

Rhine, Sam, "Anatomy of the HIV Virus." AIDS: Educating the Public. Indiana Academy of Science pamphlet: Indiana State Library, pp.3-4, November 1986.

Rhine claimed that "because the AIDS virus had been called so many different names, the medical community decided to assign it the single generic name human immunodeficiency virus (HIV)." Rhine noted that previous names included: (1) human T-cell lymphotrophic virus (HTLV-III), (2) lymphadenopathy-associated virus (LAV), and (3) AIDS-related virus (ARV).

Rhine pointed out that the HIV belongs to the family retroviradae. Rhine noted that the re in retroviradae stands for reverse, and the tr in retroviradae stands for transcriptase. Rhine explained that a virus from the retroviradae family makes DNA from their RNA by using an enzyme called reverse transcriptase which is triggered by the RNA dependant DNA polymerase of the host. Rhine pointed out that this is the reverse of the way all other organisms in nature synthesize proteins for reproduction.

Structure and function of the HIV

Bardell, David, "The Biological Nature of the AIDS Virus," The American Biology Teacher, 48:75-77, February 1986.

Bardell claimed that biology teachers need to know the "biological nature" of the AIDS virus to explain the disease in the classroom. Bardell described how the virus infects its victim and how it replicates itself.

Bardell explained that the AIDS virus belongs to a family of spherically shaped, reverse transcriptase-using viruses called retroviruses. Bardell noted that the genetic material of the retrovirus family is single-stranded RNA which is protected by a protein capsid and contained in an envelope made of lipid, protein, and carbohydrate. Bardell indicated that the envelope determines what cells the virus will infect since there is an affinity between the envelope of the virus and cerain host cells.

Bardell described a six step process by which the AIDS virus infects its victim. The steps of infection, as described by Bardell, were: (1) the virus infects the cell, (2) the envelope and the capsid are removed, (3) the RNA is exposed and is used as the template to form an RNA-DNA molecule by using reverse transcriptase, an RNA polymerase, (4) the DNA of the RNA-DNA hybrid template is used to form a complementary strand of DNA, (5) a double-stranded DNA is produced and integrated into the host cell DNA, and (6) viral components and progeny are produced when the DNA of the host cell carries out normal reproductive functions; this occurs because the DNA transcribes the viral DNA that had integrated with the host cell DNA earlier.

Bardell noted that the AIDS virus attacks T-helper cells which the antibody-producing B-cells depend on for the stimulation they need to become plasma cells and antibody producers. Without antibody production, Bardell explained, "acquired immunodeficiency" occurs; antibodies are needed to fend off disease. Bardell noted that developing a drug to fight the virus would be difficult since the viral gene code for its envelope production mutates so often. Bardell also noted that any drug that could attack the virus before it developed its protective envelope would also kill the host cell because the virus is located in the DNA of the host cell prior to envelope production.

Tortora, Gerard J., et al., "Retroviruses." Microbiology: An Introduction. Benjamin/Cummings Publishing Company, Inc. Menlo Park, California, pp. 362-364, 1986.

The authors described the stages of the infection and multiplication of retroviruses. Five stages were described: (1) the virus penetrates the host, (2) the envelope is shed from the virus while reverse transcription of the viral RNA produces double-stranded DNA, (3) the double stranded DNA integrates with the host cell DNA becoming a provirus; as the host cell undergoes normal reproduction, all host cell progeny will have inherited the viral genes, but the genes will remain latent until they are transcribed, (4) if transcription of RNA does occur, the new strands serve as mRNA to produce capsid proteins and to become viral genomes, and (5) two identical strands of RNA are incorporated into a capsid and released.

Rainis, Kenneth, "Understanding AIDS," Ward's Natural Science Bulletin, Bulletin No. 0850. 4pp., Rochester, NY: Ward's Natural Science. 1987.

Rainis indicated that the HIV is a retrovirus, and that retroviruses are biologically unique in at least two ways: (1) retroviruses use reverse transcriptase enzyme to transcribe their RNA into DNA; the DNA is then inserted into a chromosome of the host cell becoming a provirus to serve as a template for viral reproduction when the DNA of the host is activated, and (2) the HIV, like other retroviruses, use reverse transcriptase enzyme. Rainis explained that all other life forms produce RNA from DNA, but because of reverse transcriptase, retroviruses can produce DNA from RNA.

Rainis explained a nine step sequence of events by which the HIV infects its victim to cause an immune deficiency syndrome. The steps of infection, as explained by Rainis, were: (1) the HIV enters the bloodstream, (2) the envelope of the HIV binds to a T4 white blood cell, (3) viral RNA and reverse transcriptase enter the T4 cell as the protein envelope is shed, (4) the RNA is reverse transcribed into a double stranded DNA molecule, (5) the newly formed DNA becomes a provirus by integrating itself with the T4 cell DNA where it will lie dormant until the T4 cell is activated, (6) when the T4 cell is activated, the DNA provirus is used as a template for the synthesis of RNA chains, (7) some of these RNA chains become genome RNA molecules to be packaged into viral particles while other RNA will yield mRNA to synthesize viral envelope proteins and reverse transcriptase, (8) the RNA and reverse transcriptase are packaged inside the synthesized protein envelope, and (9) masses of newly formed viral particles interact with the cell membrane and punch holes through it as they bud, thus causing the T4 cell to lyse and die. Since T4 cells are needed to stimulate B-cells to produce antibodies that attack invading microbes, Rainis pointed out that the victim "acquires an immune deficiency problem" when the T4 cells are killed.

Gallo, Robert C., "The AIDS Virus," Scientific American, 256:1:45-56, January 1987.

Gallo reported that the AIDS virus probably was introduced as a new infection to man in the 1950's in Central Africa. Gallo claimed a green virus called simian T-lymphotropic virus III (STLV-III) may be the ancestor of the HIV. Gallo noted that the STLV-III may have been transmitted to a human; then viral mutations occured yielding the human T-lymphotropic virus III (HTLV-III) which is the deadly AIDS virus now called HIV. Gallo explained that the HIV attacks T-helper cells by bonding to them because of an affinity of the viral envelope for the T-cells. Gallo pointed out that the HIV then undergoes the following sequence of events: (1) the HIV sheds the envelope and releases its RNA and reverse transcriptase enzyme into the host T-helper cell, (2) the RNA is reverse transcribed to form DNA which then attaches to T-helper cell DNA, and (3) any time the T-helper cell is activated to reproduce, the HIV components are also produced; the HIV progeny then burst through the cell membrane of the T-helper cell, thus killing it. Gallo explained that the STLV-III virus was harmless, but that the HIV that evolved from it is deadly.

Gallo noted that the HIV can be transmitted from carrier to victim through intimate contact, and shared blood. Gallo stated that the HIV can be isolated from blood, plasma, semen, and that the presence of the HIV in the body is associated with the loss of T-helper cells.

Gallo also explained that Pneumocystis carinii pneumonia and Kaposi's sarcoma are two opportunistic diseases that commonly afflict AIDS victims. Gallo claimed these are rare diseases which afflict only those with abnormal immunosuppression.

Gallo explained that the goal of successful drug therapy would be to disrupt reverse transcriptase to block replication of the HIV. Gallo also noted that a workable vaccine must be capable of stimulating B-cells into producing antibodies that can bind with the envelope of the HIV to prevent the virus from attaching to host cells; the vaccine must also be able to attack and destroy cells already infected by the virus.

Gallo concluded by pointing out that everyone is at risk of getting AIDS when having intimate contact or sharing body fluids with a carrier. Even if therapy and vaccines were discovered and produced as fast as possible, Gallo noted millions with the disease will already have died. Gallo also noted that since the HIV mutates so often and there are countless strains of it, perhaps no vaccine could ever be produced to counter all the types of HIV that exist or may develop.

AIDS: EFFECTS OF THE VIRUS

Discovery of an immunosuppression problem in the U.S.

Tortora, Gerard J., et al., "Acquired Immune Deficiency Syndrome (AIDS) Update: A Medical Detection Report." Microbiology: An Introduction. Benjamin/Cummings Publishing Company, Inc. Menlo Park, California, pp. 482-484, 1986.

The authors reported that in 1981, the Center for Disease Control (CDC) became aware of an increase in the number of cases of the rare opportunistic diseases called Pneumocystis carinii pneumonia (PCP) and Kaposi's sarcoma (KS). According to the authors, many of those who had developed PCP and KS were young adults and children. The authors claimed serious questions were raised since these diseases usually affect elderly and immunosuppressed people, not young adults and children. The authors stated that the CDC determined that something was spreading through society and causing immunosuppression. The newly identified condition was named "acquired immune deficiency syndrome" commonly refered to as AIDS. Some of the common symptoms of AIDS were identified in the report and included: (1) fever, (2) appetite loss, (3) weight loss, (4) extreme fatigue, (5) diarrhea, (6) persistent cough, (7) night sweats, (8) enlarged lymph nodes, and (9) any symptoms caused by any of the following opportunistic infections: PCP, KS, yeast infections, cytomegalovirus infections, herpes, and toxoplasmosis.

The authors explained that the numbers of new AIDS cases had been doubling about every six months since 1981, and that the primary victims were homosexual and bisexual men, intravenous drug users, hemophilia patients, heterosexual partners of AIDS sufferers, and transfusion recipients. The report indicated that since 1981, 90% of the AIDS victims were between 20 and 49 years of age, and 94% were males. Also, 48% of known AIDS cases since 1981 died within two years.

Tortora, Gerard J., et al., "Protozoan and Helminthic Diseases of the Lower Respiratory System." Microbiology: An Introduction. Benjamin/Cummings Publishing Company, Inc. Menlo park, California, pp. 630-631, 1986.

The authors described Pneumocystic pneumonia (PCP) as being an opportunistic disease caused by the sporozoan Pneumocystis carinii. The authors explained that people can contract this disease if they are immunosuppressed. Three modes of immunosuppression were described: (1) immunosuppressive drugs being used to minimize rejection of transplanted tissue, (2) presence of cancer which lowers immunity, or (3) persons with acquired immune deficiency syndrome (AIDS).

The authors claimed, "PCP causes the alveoli of the lungs to fill with a frothy exudate." The most important fact about PCP, according to the authors, was that only people with immune deficiencies get this disease.

Pike, Loy. "AIDS." Indiana University at South Bend Medical Microbiology lecture. South Bend, Indiana. April 30, 1987.

Pike cautioned, "What is told in tonight's lecture may change next month or year...information about AIDS changes almost monthly as more is learned about the disease." Pike noted that AIDS was first recognized 1981 when a young man experienced recurrent opportunistic infections that people with healthy immune systems very rarely get. Pike noted that the opportunistic diseases that most AIDS victims get are so rare that the drugs needed to fight them are not mass produced and are only available from the Centers for Disease Control (CDC). Pike explained that the documentation of the increased distribution of these drugs by the CDC indicated an increase in immunodeficiency cases in the country. According to Pike, drugs which are used to fight the two common opportunistic afflictions of AIDS victims, Pneumocystis corinii pneumonia (PCP) and Kaposi's sarcoma (KS), have been distributed in greater quantities in the past few years. Pike noted that Kaposi's sarcoma had previously only affected old Jewish men from the Mediterranean. Pike explained that this form of cancer destroys capillaries and young men with healthy immune systems do not develop this disease.

Pike claimed that most AIDS cases in the world can be found in the United States and Africa. Pike noted that male homosexuals, men who have many sexual partners, males practicing anal sex, and especially those who are recipients of anal sex are at greatest risk of being infected by the AIDS virus. According to Pike, other risk groups include: (1) drug addicts, (2) wives and children of male carriers, (3) Haitians, and (4) hemophiliacs. Pike indicated that the main mode of transmission of the AIDS in Africa is through promiscuous heterosexual activity.

Pike also lectured on the symptoms of AIDS. Pike explained that at least three levels of AIDS exist: (1) latent cases, which are infectious people carrying the virus, but are not showing any symptoms, (2) pre-AIDS syndrome, which is exhibited in victims experiencing lymph node inflammation, and (3) full blown AIDS, which refers to those victims experiencing the full range of symptoms that occur with AIDS that include: (1) anorexia, (2) weight loss, (3) fever, (4) night sweats, (5) malaise, (6) opportunistic infections, (7) cancer, and (8) neurological problems.

Pike estimated that there may be 5 to 10 million latent cases in the world now. Pike also commented, "there may be 100 million AIDS cases by 1991."

HIV causes immunodeficiency

Laurence, Jeffrey, "The Immune System in AIDS," Scientific American, 253:6:84-93, December 1985.

Laurence described the functions of T-cells, their subsequent importance to the immune system, and why the immune system is devastated when T-cells are destroyed. Laurence reported that the AIDS virus alters the growth and function of T4 lymphocytes and that victims of AIDS show a huge decline in T4 cells.

Laurence noted that T4 cells are a "precondition" for the killing action of other T-cells and the antibody production of B-cells. Laurence noted that antibodies are needed to fight antigens that may invade the blood, lymph, or attach to walls of cells. The T4 cells, Laurence explained, combine with antigens which makes them "recognizable" cites for other T-cells and B-cells to attach to and carry out their killing effects. Laurence indicated that a state of immunosuppression obviously occurs if T4 cells are killed. Laurence indicated that T4 cells are attacked by the AIDS virus because they have the right kind of protein receptor cite for the virus to attach to. Laurence also indicated that brain cells, spinal fluid, and some epithelial tissues also have receptor cites which the AIDS virus can bond to.

Laurence discussed the infectiousness of the AIDS virus and presented evidence to support the following facts:(1) the virus can be found in the blood, semen, saliva, and tears of carriers, (2) between 1 and 2 million people in the U.S. are infected with the virus, (3) those infected may never show symptoms or may have incubation periods of months to decades, and (4) of those currently infected, 7% will develop AIDS each year. Laurence indicated that present treatment methods for AIDS have included: (1) treating the opportunistic infections as they arise, (2) conducting bone marrow transplants to provide a source for more white blood cell production, (3) administering white blood cells, interleukin-2, or interferons to stimulate the immune system, and (4) administering Suranim or Ribafrin which are drugs that inhibit the reverse transcriptase enzyme used in viral replication. Laurence claimed that antiviral drugs destroy or inhibit important cells in the host immune system which can make their use counterproductive . Commenting on the potential for creating a vaccine against AIDS, Laurence claimed that AIDS viruses can differ by more than 30% in the RNA sequences that encode proteins that recognize T-cells they seek to infect. Because of this genetic variability, according to Laurence, the creation of a vaccine that can handle all the mutated variants the AIDS virus may be impossible.

Pike, Loy. "Harmful Aspects and Abberations of the Immune System." Indiana University of South Bend Medical Microbiology course lecture. South Bend, Indiana, April 9, 1987.

Pike claimed that immunodeficiency can be inherited or acquired. Those people inheriting immunodeficiency do not have the capability of producing proper types or quantities of antibodies to fend off pathogens that may challenge the body. In essence, people who inherit immunodeficiency may need to live in bubbles that protect them from the environment. Without this seclusion, Pike pointed out that opportunistic infections develop easily, and the person with immunodeficiency usually dies in one to two years. Pike explained that people can acquire immunodeficiency by being infected with the AIDS virus. "The AIDS virus infects and kills T-helper cells," Pike explained. Pike claimed, "Without proper numbers of healthy T-helper cells, B-cells will not be stimulated into producing the antibodies necessary to fight off foreign pathogens or particulates that enter the body."

Communicable Disease Control Division. Definition of AIDS. Indiana State Board of Health: 1986.

The Communicable Disease Control Division (CDCD) developed diagnostic criteria to determine if a person has AIDS or not. The CDCD claimed,"for a person to be diagnosed as having AIDS, they had to have a disease that was indicative of an underlying cellular immunodeficiency, and they had to have no known cause of underlying cellular immunodeficiency...associated with that disease." According to the CDCD, the diseases that strongly suggest underlying cellular immune deficiency include those from the following five etiological categories: (1) protozoal and helminthic, (2) fungal, (3) bacterial, (4) viral, and (5) cancer. From the protozoal and helminthic category, the CDCD suggested the following diseases: (1) Pneumocystis carinii pneumonia, (2) cryptosporidiosis, (3) strongyloidosis, and (4) toxoplasmosis. From the fungal category, the CDCD suggested the following diseases: (1) aspergillosis, (2) candidiasis, and (3) cryptococcosis. From the bacterial category, the CDCD claimed, "finding any 'atypical' bacterial infection can suggest immune deficiency." From the viral category, the CDCD suggested the following diseases: (1) cytomegalovirus, (2) herpes infection, and (3) leukoencephalopathy caused by papoviruses. From the cancer category, the CDCD suggested the following diseases: (1) Kaposi's sarcoma, and (2) lymphoma of the brain.

The Board of Health also stated that two of the following six clinical symptoms lasting three or more months plus two of the six laboratory abnormalities listed must occur; the clinical symptoms included: (1) fever, (2) weight loss, (3) lymphadenopathy, (4) diarrhea, (5) fatigue, and (6) night sweats. Laboratory abnormalities include: (1) depressed helper T-cells, (2) depressed helper/suppressor ratio, (3) at least one of the following: leukonemia, thrombacytopenia, absolute lymphopenia, (4) elevated serum globulins, (5) depressed blastogenesis, and (6) abnormal skin tests.

(Note the definition of terms section of this study for descriptions of the diseases common to AIDS victims that were listed here.)**

Centers for Disease Control, "Classification System for Human T-Lymphotropic Virus Type III/Lymphadenopathy-Associated Virus Infections," Morbidity and Mortality Weekly Report, 35:20:334-338, May 23, 1986.

The Centers for Disease Control (CDC) pointed out that a broad spectrum of diseases, cancers, or other symptoms afflict AIDS victims. Because of this wide range, the CDC described a classification system that was developed for the manifestations of HTLV-III/LAV infections. The CDC divided the manifestations of the HTLV-III/LAV into four groups: (1) acute infections (initial onset), (2) asymptomatic infection (no visible symptoms of infection), (3) persistent generalized lymphadenopathy (enlarged lymph nodes), and (4) other diseases that included subgroup A - constitutional diseases (nonspecific diseases affecting the body for over one month, i.e. weight loss, diarrhea), subgroup B - neurologic diseases, subgroup C - secondary infectious diseases (i.e. Pneumocystis carinii pneumonia), subgroup D - secondary cancers (Kaposi's sarcoma) and subgroup E - other conditions (clinical findings of diseases not classified above).

The article concluded by pointing out that the classification system "does not imply any change in the definition of AIDS." Instead, according to the article, the classification system provided descriptions of the various ways the infection of AIDS can manifest itself in the victim.

U.S. Public Health Service. Facts About AIDS - July 1986. Updated version by Indiana State Board of Health, Fact 1A-4A AIDS. Indianapolis, Indiana: 4 pp., July 1986.

Using a question and answer format this article addressed many issues concerned with AIDS. The responses in the article described the following: (1) the cause of AIDS, (2) the symptoms of AIDS, (3) the transmission of AIDS, (4) the effects associated with AIDS, and (5) the prevention of AIDS.

This article described how AIDS can be diagnosed by using a series of tests to identify familiar and expected symptoms of AIDS. The article noted that these tests are used to identify symptoms typical of AIDS victims. The symptoms that can be tested include: (1) the rare cancer called Kaposi's sarcoma, (2) the presence of opportunistic diseases caused by otherwise harmless microbes due to immunosuppression, (3) swollen lymph nodes, (4) weight loss, and (5) a positive test for HTLV antibodies.

Quinn, Thomas C., et al., "AIDS in Africa: An Epidemiologic Paradigm," Science, 234:955-963, November 21, 1986.

The authors reported on the spread of acquired immune deficiency syndrome (AIDS) in Africa. The authors claimed, "AIDS is a global problem affecting 74 countries to date." The authors explained that "the immunopathologies of HIV infection are similar in most AIDS victims even though the epidemiology and clinical features of the infection may differ from country to country."

It was reported that 85% of recorded African AIDS victims contracted the disease through heterosexual activity, perinatal transmission, and blood transfusions. In Africa, the authors reported that no cases of AIDS had been traced to intravenous drug use, less than 5% of African AIDS cases had been traced to homosexual or bisexual activity, and less than 4% of African AIDS cases have been traced to blood transfusions. Also, African AIDS victims typically exhibit symptoms of the disease in the form of gastrointestinal and dermatological manifestations. The authors noted that the facts about the transmission and clinical symptomology of AIDS in Africa are unique when compared to the usual transmission modes and clinical symptoms of AIDS infection recorded elsewhere.

Unlike African AIDS vicitms, according to the authors, 80% of the European and Asian AIDS victims had contracted the disease from homosexual or bisexual activity or from intravenous drug usage. Also, the authors noted, European and American AIDS patients typically exhibit Pneumocystis carinii pneumonia or Kaposi's sarcoma as the common symptoms of AIDS infection. Nevertheless, the authors explained, the immunopathologies of AIDS infection are the same for any victim in any country.

The authors concluded with a call for "international committment to provide financial aid, scientific support, educational programs, and technical assistance for poor uneducated countries like Africa to stop the further spread of the AIDS virus. Indicative of the importance of controlling AIDS everywhere, the authors stated, "With 74 countries of the world affected by AIDS and several million people carrying the virus, worldwide cooperation is a necessity."

Farthing, C.F., et al. A Colour Atlas of AIDS. London: Wolf Medical Publications Ltd., 78 pp., 1986.

The authors presented photographs of AIDS patients to provide examples of each of the clinical manifestations of AIDS. Some of the common opportunistic diseases that afflict persons with AIDS that were shown included: (1) Pneumocystis carinii pneumonia (PCP), (2) Kaposi's sarcoma (KS), and (3) lymphoma. Some of the common symptoms of AIDS that were shown in the atlas were:(1) lymphadenopathy, (2) severe weight loss, and (3) oral thrush and leukoplakia. The authors presented the names of the opportunistic microbes with the opportunistic disease they cause.

The authors described the immunosuppression that afflicts AIDS victims and presented actual pictures of the HIV budding from a T-cell causing its death.

Miller, David, et al., "A 'Pseudo-AIDS Syndrome Following From Fear of AIDS," British Journal of Psychiatry, 146:550-551, Dec. 1985.

Miller described two cases where persons showed psychiatric symptoms associated with a fear of Acquired Immune Deficiency Syndrome. Despite negative test results for AIDS, Miller indicated that fear of AIDS alone can convince some psychologically vulnerable people into believing they have the disease and that they are actually suffering from it. The two cases cited by Miller were young homosexual males who had presented their fear of AIDS to professionals. Because of their homosexual activity and fear of AIDS, Miller explained, they had assured themselves that they had AIDS. One individual, according to Miller, became so depressed he planned his suicide and made a will. This person, according to Miller, received counseling on measures to reduce the risk of contracting AIDS, and an education about what the true symptoms of AIDS are. The other case reported by Miller was similar in that the belief that AIDS had been contracted was present and the feeling of hopelessness had set in. Both victims were treated through counseling and education about AIDS and its symptoms.

Miller concluded by indicating that psychiatric symptoms resulting from a fear of AIDS can occur, and physical changes due to the depression that accompanies such fear can mimic the early stages of AIDS.

AIDS: MODES OF TRANSMISSION

Known modes

American Red Cross. AIDS and Children. Bulletin AIDS-21, 5pp., Washington, D.C.: U.S. Public Health Service, October 1986.

This bulletin described the modes by which AIDS can be transmitted, what groups were at highest risk for contracting AIDS, and it concluded with recommendations concerned with AIDS prevention for women and schools. The bulletin indicated that the modes of transmission of the AIDS virus include: (1) sexual contact in which blood or body fluids (semen, urine, feces, vaginal secretions) are transmitted from an AIDS carrier to an uninfected person, (2) sharing drug needles contaminated with the AIDS virus, (3) perinatal transmission from an infected woman passing the AIDS virus to her child before, during, or shortly after birth, and (4) transfusion of blood or blood components contaminated with the AIDS virus. The bulletin reported that a new test to screen blood for AIDS has greatly reduced the risk of infection by transfusion.

The bulletin emphasized that AIDS can not be spread through casual contact; examples of casual contact were: (1) working at the office, (2) attending school, (3) eating in restaurants, (4) swimming in public pools, (5) shaking hands, (6) hugging, (7) sneezing, and (8) coughing. The bulletin claimed, "not a single case of AIDS has been traced to infection by casual contact of any kind."

The bulletin explained that 98% of all reported AIDS cases in the U.S. since 1981 have been among: (1) sexually active homosexual and bisexual men who have had sex with another man since 1977 (65%), (2) present or past abusers of illicit intravenous drugs (17%), (3) homosexual and bisexual men who are also intravenous drug abusers (8%), (4) persons who have had transfusions of blood or blood clotting disorders who have received blood clotting factors (1%), (5) heterosexual men and women having sex with an AIDS carrier (4%), and (6) infants born to mothers infected with AIDS (1%).

American Red Cross. AIDS, Sex, and You. Bulletin AIDS-9, 5pp., Washington, D.C.: U.S. Public Health Service, October 1986.

This bulletin indicated that intimate sexual contact is the most common way of transmitting the AIDS virus. The bulletin noted, "sexually active Americans need to know the basic facts about AIDS to avoid the risk of infection." The bulletin claimed that the AIDS virus has been found in blood, semen, vaginal secretions, saliva, urine, breast milk, and tears, but studies have indicated the virus can only spread during the sharing of body fluids during sex and from exchanging blood. The bulletin emphasized that the virus is not spread by casual contact. The bulletin cautioned that many carriers do not show signs of infection, but are still contagious. To avoid infection with AIDS, the bulletin recommended: (1) avoiding sex with multiple partners, and with persons who have had multiple partner, (2) avoiding sex with anyone known to have AIDS or who has tested positive for AIDS, and (3) using condoms.

American Red Cross. Fact About AIDS and Drug Abuse. Bulletin AIDS-12, 4pp., Washingon, D.C.: U.S. Public Health Service, October 1986.

This bulletin cautioned that the AIDS virus that lives in the blood of carriers may be spread from one person to another by sharing infected needles in the use of intravenous (IV) drugs. The bulletin cautioned, "having sex with a person who injects drugs is not safe...IV drug users make up the second greatest risk group for contraction of AIDS."

The bulletin emphasized that to avoid contracting AIDS, IV drug abusers should stop using and shooting drugs; however, if IV drug use continues, then users should not share needles, syringes, or any other object that draws blood with anyone. The bulletin warned IV drug users to avoid sex with other IV drug users, homosexuals, bisexuals, or prostitutes. The bulletin indicated that sex with these people increases the chances of contracting AIDS. As a precautionary measure, the bulletin implored everyone having sex with IV drug abusers, homosexuals, bisexuals, or prostitutes to use condoms, and avoid anal sex. The bulletin explained that anal sex causes injury to body tissues thereby increasing the risk of AIDS virus transmission.

Centers for Disease Control, "Human Immunodeficiency Virus Infection in Transfusion Recipients and Their Family Members," Morbidity and Mortality Weekly Report, 36:10:137-149, March 20, 1987.

The Centers for Disease Control (CDC) reported that many leukemia patients recieving transfusions before 1985 had become infected with HIV. The CDC reported that several persons with transfusion-associated HIV infection had transmitted the virus to their sexual partners and newborn children.

The CDC also described a case where an elderly man with no known risk for AIDS received several units of blood in 1982; one donor of the blood he received later tested positive for AIDS. The CDC reported that in 1983 the man developed Pneumocystis carinii pneumonia (PCP) and died in 1984. The CDC found that the wife of this man had had vaginal intercourse with him until he became ill in 1983; in 1984, the wife tested positive for HIV antibody. The CDC described another case of a pregnant woman who received four units of blood contaminated with HIV. The woman's baby died of PCP eight years later, and the tests taken of the woman, her son, and her husband for AIDS proved to be positive for all of them.

Centers for Disease Control,"Recommendations for Assisting in the Prevention of Perinatal Transmission of Human T-Lymphotropic Virus Type III/ Lymphadenopathy-Associated Virus and Acquired Immunodeficiency Syndrome," Morbidity and Mortality Weekly Report, 34:48:720-722, Dec. 6, 1985.

This article recommended counseling for pregnant women who have AIDS to provide them with information about the management of the pregnancy and caring for the child. The article also recommended that physicians encourage infected women to either delay or cancel plans to become pregnant until more is known about perinatal transmission of the AIDS virus and the chances for the baby to survive to adulthood improve. Also, the article recommended that uninfected women learn how to avoid becoming infected through counseling.

The article indicated that as of December 1, 1985, 215 cases of AIDS occurring among children under 3 years of age were reported to the CDC; the article noted that 165 cases (76%) of these children had as their only risk factor a mother belonging to a group with increased prevalence of HTLV-III infection. The article concluded by reporting that HTLV-III can be transmitted from infected women to their fetuses or offspring during pregnancy, labor, delivery, or perhaps shortly after birth via breast milk.

Centers for Disease Control, "Surveillance of Hemophilia-Associated Acquired Immunodeficiency Syndrome," Morbidity and Mortality Weekly Report, 35:43:669-671, October 31, 1986.

According to this article, as of September 15, 1986, a total of 238 cases of hemophilia-associated AIDS had occurred. The article explained that hemophiliacs require a blood product called coagulant factor; the coagulant factor can be contaminated with the AIDS virus. The article indicated that before the mandatory screening for the AIDS virus in all .. donated blood and blood products, cases of hemophilia-associated AIDS steadily increased. However, the article noted, since mandatory screening has been in effect for use on all blood and blood products, the chances of contaminated blood making its way into blood supplies have been significantly reduced.

HIV not transmitted by casual contact

American Red Cross. AIDS and Your Job-Are there Risks? Bulletin AIDS-20, 6 pp., Washington, D.C.: U.S. Public Health Service, October 1986.

This bulletin discussed the possibilities of contracting AIDS at the workplace. The bulletin claimed that AIDS is a very hard disease to catch. The bulletin emphasized that AIDS can not be spread by casual contact. The bulletin stated that recent surveys have shown that nearly one third of all Americans believe AIDS can be spread by casual contact, in spite of all the scientific evidence to the contrary.

The bulletin presented various facts about the disease and concluded that workers need not worry about getting AIDS on the job since AIDS can not spread in the air, food, or by routine, nonsexual, everyday casual contact. However, food handlers with AIDS were cautioned to avoid work if they have open sores or skin lesions. The bulletin also cautioned personal service workers (cosmetologists, barbers, and so forth) to sterilize any equipment that could draw blood (razors, needles for acupuncture), and to refrain from work with clients if they or the client have AIDS and have open sores or lesions.

Black, Jeffrey L., "AIDS: Preschool and School Issues," Journal of School Health, 56:3:93-95, March 1986.

Black examined the epidemiological, clinical, and public health aspects of acquired immunodeficiency syndrome (AIDS) in children. Black also described the modes of transmission of the AIDS virus. Black discussed information gathered from the Centers for Disease Control (CDC) that applied to the school setting. Black indicated that schools have little to worry about when admitting a student with AIDS. Black noted that no cases of AIDS infection in the U.S. are known to have been transmitted in school, day care, or other casual person-to-person contact. Black also explained that opportunistic infections of AIDS patients pose no risk to their "immunologically normal" classmates. Black indicated that a "theoretical" potential for transmission would be greatest among younger preschool children and neurologically handicapped children who lack control of their body secretions and children who bite. However, Black stated, "any possible transmission most likely would involve exposure of open skin lesions or mucous membranes to blood, and to other body fluids of an infected person."

Based on the information about AIDS presented, Black recommended that schools forming policies on handling students with AIDS should not allow preschool children with AIDS to attend the classroom because of the "theoretical" potential for transmission of the AIDS virus due to "the oral behavior and incontinence of toddlers." Instead, they should be given a nonclassroom, individualized education until the child demonstrated achievement of bowel and bladder control as well as control over biting. Black advised that school-age children with AIDS be allowed in school if they do not bite, are continent, and have no open or oozing lesions. Black noted that because of immunosuppression, children with AIDS should be excused from school during epidemics of infections. Also, Black noted, precautions should be taken to prevent children from sharing eating utensils or having oral contact with a child carrying AIDS.

AIDS: PREVENTING THE SPREAD

Recommendations for government and the general public

Centers for Disease Control, "Additional Recommendations to Reduce Sexual and Drug Abuse- Related Transmission of HTLV-III/LAV," Morbidity and Mortality Weekly Report, 35:10:152-155, March 14, 1986.

This article explained that the AIDS virus is transmitted through sexual contact, parenteral exposure to infected blood, and perinatally from mother to fetus or neonate. The article suggested that by increasing the numbers of serological testing sites and guaranteeing anonymity for those who get tested, more people would take the test to find out if they have AIDS or not. The article noted that those who do find out they have AIDS should be offered counseling and medical evaluation. The article explained that if more of the people who are infected with the AIDS virus knew they had it, they would take steps to avoid transmitting it to others. The article pointed out that counseling would help them learn how to avoid spreading it, and the overall spread of AIDS could be reduced significantly.

Centers for Disease Control, "Positive HTLV-III/LAV Antibody Results for Sexually Active Female Members of Social/Sexual Clubs- Minnesota," Morbidity and Mortality Weekly Report, 35:45:697-698, November 14,1986.

This article claimed that HTLV-III/LAV is transmitted through sexual contact, and from sharing intravenous (IV) drug needles that may be contaminated with the bloodborne virus. The article described an oubreak of AIDS in a sex club made up of 285 members (143 women and 142 men) in the Minneapolis-St. Paul area of Minnesota. The article reported that 55 of 134 members that were tested for AIDS had positive results. As a result, according to the article, the sex club disbanded after being advised by health officials that the risk would be extremely high to continue sexual activity.

The article advised that people should avoid making sexual contact with multiple partners or with persons who have been sexually active with multiple partners. The article also concluded that those not following this advice have a much higher risk for infection and should at least avoid sexual practices that permit the exchange of blood, semen, urine, feces, saliva, and vaginal secretions. Also, the article suggested the use of condoms to help avoid the transmission of AIDS.

Wheeler, David L., "Panel Calls for More University Research in National Effort to Stop Spread of AIDS," The Chronicle of Higher Education, 33:10:7-10, November 5, 1986.

Wheeler described the recommendations that were formed by a committee of experts from the National Academy of Sciences and the Institute of Medicine that suggested efforts to stop the spread of AIDS and to find a cure for it. The recommendations included: (1) more involvement by universities and industry in efforts to stop the spread of AIDS and to find a cure for it, (2) federal spending on AIDS research should quadruple to $1 billion by 1990, and (3) $1 billion should be spent annually on prevention through education efforts in the United States.

American Red Cross. If Your Test for Antibody to the AIDS Virus is Positive..., Bulletin AIDS-14, 5 pp., Washington, D.C.: U.S. Public Health Service, October 1986.

This bulletin described the AIDS antibody test. The bulletin noted that the test is a laboratory blood test used to determine whether a person has been infected with the AIDS virus. Blood is tested for the presence of antibodies to the AIDS virus. The bulletin explained that when a disease organism enters the blood, the immune system produces antibodies to fight it; if the antibody to the AIDS virus test is positive, then the AIDS virus had infected the body because antibodies against it had been produced. The bulletin emphasized that a positive test does not indicate that the person will necessarily develop the fatal AIDS; persons testing positive may remain free of symptoms or only develop minor AIDS-related illnesses. However, the bulletin indicated, even when no symptoms occur and a test for AIDS is positive, the person is still infectious and will carry the virus for life.

The bulletin concluded with these recommendations for individuals who test positive: (1) tell all sex partners about the positive test as well as anyone whom intravenous drug needles or syringes were shared with and urge them all to be tested for AIDS, (2) avoid sex to eliminate any risk of spreading the AIDS virus, (3) if it is decided to have sex, partners are urged to take precautions to avoid contact with body fluids such as blood, semen, urine, feces, saliva, and vaginal secretions, (4) use a condom, avoid oral-genital contact and anal intercourse, (5) do not share toothbrushes, razors, or any item that can draw blood, (6) do not donate blood, organs, plasma, sperm, or any body tissue, and (7) females who test positive should not risk transmission of the AIDS virus to the fetus or newborn by avoiding pregnancy.

Preventive measures for individuals in the workplace

Centers for Disease Control, "Human T-Lymphotropic Virus Type III/Lymphadenopathy-Associated Virus," Morbidity and Mortality Weekly Reports, 35:34:540-549, August 29,1986.

This article warned health care workers and laboratory workers to be extremely cautious when handling blood, cultures, or other materials contaminated with the AIDS virus. The article described CDC recommendations which called for the use of "special practices" when handling contaminated materials to avoid infection; the CDC recommended the use of "special practices" for: (1) handling needles, syringes, sharp instruments, (2) handling infectious fluids, tissues, or cultures, (3) handling infectious materials of all kinds while having lesions on the hands, (4) handling infectious aerosols, splashes, and spills, (5) handling human serum, (6) handling nonhuman primates infected with the AIDS virus, and (7) cleaning infected surfaces. All of the CDC recommendations were similar in that they all suggested means to avoid contact with contaminated materials in the various situations just listed.

Lusby, Grace, et al., "Infection Control at Home," The American Journal of Hospice Care, March/April 1986: 24-27.

Lusby provided information directed at home care personnel to enable them to utilize appropriate precautions to prevent the transmission of AIDS. Lusby noted that the AIDS virus is transmitted through blood and blood products and in sexual encounters where contaminated body fluids are exchanged. Lusby claimed that although the AIDS virus has also been found in saliva and tears, not a single case of AIDS has ever been contracted from contact with contaminated saliva or tears. Lusby also claimed that no family member or health care worker of an AIDS patient has contracted AIDS from any casual contact.

Lusby presented common sense precautions that were recommended by the Centers for Disease Control (CDC) to use when caring for an AIDS patient. The recommendations included: (1) always wearing gloves before contact with secretions and excretions such as vomit, feces, blood, urine, and other body fluids, (2) always use soap before and after the examination of the patient or after making contact with secretions and excretions, (3) use bleach to clean up spills and to wash soiled linens of the patient, (4) wear gowns if splatters from patients are expected, and (5) wear a mask if the patient is coughing.

American Red Cross. Caring for the AIDS Patient at Home, Bulletin AIDS-18, 6pp., Washington, D.C.: U.S. Public Health Service, October 1986.

This bulletin urged those people assuming the responsibility of being a care provider of an AIDS patient to learn the cause of AIDS, how it is spread, and how the blood and body fluids of the AIDS patient should be handled.

The bulletin urged everyone in households shared with an AIDS patient to adhere to the following practices to limit the risks of viral transmission: (1) take showers instead of bath, (2) everyone use their own individual towel and washcloth, (3) do not share razors and toothbrushes, (4) keep showers, washbasins, and toilet bowls clean, (5) use disposable tissues instead of handkerchiefs, and discard them after use, (6) wear gloves when handling blood specimens and blood-soiled items, body fluids, excretions, secretions, as well as surfaces, materials, and other objects contaminated with these fluids, (7) clean surfaces contaminated by patient fluids with a 10:1 ratio of bleach and water, (8) wear a coverall garment when clothing may be exposed to a patient's body fluids, blood, or excretions, (9) remove gown and gloves before leaving the patients room and immediately wash with soap and hot water, and (10) burn or seal in a bag for disposal any disposable items soiled by any fluids from the patient.

Centers for Disease Control, "Recommendations for Preventing Transmission of Infection with Human T-Lymphotropic Virus Type III Lymphadenopathy-Associated Virus in the Workplace," Morbidity and Mortality Weekly Report, 34:45:681-694. Nov. 15, 1985.

This article contained specific detailed recommendations about the use of appropriate precautions to prevent the transmission of AIDS or any other infectious disease in the workplace. According to the article, health-care workers are at highest risk of getting blood from persons infected with the AIDS virus. However, the article noted that since there is so much public concern about the risk of transmission of the AIDS virus by personal service and food service workers, recommendations were also made for these workers. The article emphasized that there is no known risk of AIDS virus transmission at offices, schools, factories, and construction sites. The article repeatedly emphasized that "the AIDS virus is a bloodborne, sexually transmitted disease that is not spread by casual contact or through preparation or serving of food and beverages." The article recommended that workers, especially food service workers, with AIDS should not be restricted from work unless they have another infection or illness that warrants restriction. The article indicated that health care workers should take all possible precautions to prevent "needlestick" injuries, and to prevent unnecessary and avoidable contact with patient body fluids to minimize the risk of being contaminated by the AIDS virus.

Prevention and blood transfusions

Centers for Disease Control, "Transfusion-Associated Human T-Lymphotropic Virus Type III/Lymphadenopathy-Associated Virus Infection From a Seronegative Donor- Colorado," Morbidity and Mortality Weekly Report, 35:24:389-391, June 20, 1986.

This article reported on the first transmission of infection from a blood donor that occurred despite routine screening for HTLV-III antibody in blood banks and plasma centers. The article described three isolated incidences where different people had received blood transfusions from screened donor blood yet still came down with the AIDS virus infection. The article concluded with an explanation about how this could occur. The article explained that when a person becomes infected with the AIDS virus, it may take two to three months before detectable antibodies to the virus are developed in the body in detectable quantaties. The article concluded that since antibody may not be detectable in blood from donors with very recent infection, this would explain why infected donors can appear free of contamination and produce a negative test for antibodies to the AIDS virus and donate infected blood. The article indicated that potential donors enter deferral programs to learn about the practices that increase the risk of HTLV-III infection. From deferral programs, potential donors meet with counselors who in turn determine if the potential donor may be a risk based on the questioning during counseling. Finally, the report noted, an antibody to the AIDS virus blood test is given to screen the blood. This process has nearly eliminated all possibilities for contamination.

Preventive measures for gay and bisexual men

American Red Cross. Gay and Bisexual Men and AIDS, Bulletin AIDS- 16, 6pp., Washington D.C.: U.S. Public Health Service, October 1986.

This bulletin presented Public Health Service recommendations for gay and bisexual men to abide by to reduce their chances of contracting or transmitting AIDS. The bulletin recommended that they should avoid sex with AIDS carriers, suspected AIDS carriers, or people who tested positive for AIDS. If it is decided to have sex, they should abide by the following recommendations: (1) use condoms to reduce the possibility of transmitting the virus, (2) avoid sexual practices that may cause injury or rips in tissue such as anal intercourse, (3) avoid oral-genital contact, (4) avoid open-mouthed, intimate kissing, (5) avoid contact with any body fluids, (6) avoid sex with multiple partners, (7) avoid sex with people who inject drugs, (8) do not donate blood, organs, sperm, or tissues, and (9) do not inhale nitrates because they contribute to Kaposi's sarcoma. The bulletin urged all gay and bisexual men to get a blood test to check for AIDS and then take appropriate measures.

School Responsibilities

Crosson, James E., "Infectious Disease and the Public Schools," Document Resume. Des Moines, Iowa: Drake Univ., 15 pp., 1985.

Crosson briefly described the pathology and communicability of various infectious diseases, including AIDS. In light of the facts presented, Crosson described the responsibilities of schools in handling students with infectious diseases. Crosson claimed that Section 504 of the Vocational Rehabilitation Amendments of 1973 and the Education for All Handicapped Children Act of 1975 stipulate that "infected children may not be denied public educational services, and if they are deemed handicapped, they must be provided a free, appropriate public education in the least restrictive environment." Crosson noted, "Schools must admit infected children and prevent the risk of spreading infection by employing some means of assessing the risk."

Despite precautionary measures taken by schools, Crosson felt that school liability insurance may not provide protection against legal action by a victim of disease transmission if "discovered" liability can be found on the grounds of noncompliance with so much as one of the many school health standards. Therefore, Crosson strongly recommended schools to be in close contact with infected students and their physicians to evaluate the risks of transmission regularly, and uphold school health standards "to the key."

Crosson suggested that schools should follow the recommendations made by the Centers for Disease Control regarding handling infected children in school. Crosson concluded by making the claim that the greatest risk for schools at this time is the potential for legal action taken by employees, parents, or susceptible children. Crosson encouraged schools to, "implement proceedures and face the associated risks in the interest of assuring each child's right to an education."

Price, James H., "AIDS, the Schools, and Policy Issues," Journal of School Health, 56:4:137-139, April 1986.

Price explained that because, "health authorities have predicted that as many as 5 million Americans will be carriers of the AIDS virus by 1991...the U.S. Public Health Service has developed a framework for the control and prevention of AIDS by the year 2000 in efforts to stem the tide of the AIDS epidemic." The objectives to be used to achieve these goals included: (1) implementing national, state, and community risk reduction and education programs, (2) design and evaluate improved prevention and control measures, and (3)incorporate new intervention tools such as vaccines and antivirals as they become available.

The final portion of the article discussed AIDS among children, and how schools should handle them. Price noted that Centers for Disease Control (CDC) statistics indicate that of all AIDS cases, only 1.5% were children under 18 years of age, and 79% of all children with AIDS were below 6 years of age. Regarding school responsibility, Price recommended that schools: (1) protect the confidentiality of students with AIDS, (2) allow students with AIDS to eat in the cafeteria with their peers, (3) excuse students with AIDS from vaccinations since their immune systems are impaired, and (4) provide a strong AIDS curriculum since, as Price put it, "prevention through education is the best weapon against AIDS."

Centers for Disease Control, "Immunization of Children Inflicted with HTLV-III/LAV Lymphadenopathy-Associated Virus," Morbidity and Mortality Weekly Report, 35:38:595-604, September 26, 1986.

This article described the immunological abnormalities associated with persons infected with the AIDS virus (HTLV-III/LAV). The article indicated that children infected with HTLV-III/LAV need to be evaluated to determine if the potential benefits gained by receiving an immunization will outweigh the adverse effects that could occur because of the immunosuppressed state which persons infected with AIDS experience.

The article presented data which supported the following recommendations: (1) live-virus and live-bacterial vaccines should not be given to children and young adults who are immunosuppressed because of AIDS, (2) only inactivated vaccines and passive immunizations should be given to children infected with AIDS; these would not endanger the immune system like infectious live microbes that are used to induce antibody production would, and (3) children whose household members are known to be immunocompromised due to AIDS should receive a substitute for those vaccines containing live viruses that can be excreted; the viruses of these vaccines can be transmitted when excreted to a household member with AIDS.

Vaccines and drug treatments

Burns, John J. and Jerome E. Groopman, "Antiviral Drugs," Issues in Science and Technology, 3:2:102-110, Winter 1987.

In this article, Burns and Groopman presented evidence which supported their claim that developing effective antiviral drugs has proven to be "notoriously difficult." Burns and Groopman described the life cycle of the AIDS virus, and they demonstrated how an antiviral drug would have to work to disrupt the most vulnerable stages of the lifecycle to be effective. Burns and Groopman noted that the AIDS virus is a retrovirus which thrives in the nucleus of host cells; because of this fact, it is difficult to create drugs that can attack the AIDS virus without also attacking the host cell.

The authors described a drug called azidothymidine (AZT) which has proven to be successful in preventing some of the recurrent opportunistic infectious diseases that afflict AIDS patients. Burns and Groopman reported that AZT inhibits reverse transcription of the AIDS virus in-vitro, but its mechanism of action in-vivo is still unknown. According to Burns and Groopman, AZT is not a cure for AIDS, but it has demonstrated the capability to prolong the life of AIDS victims by preventing many opportunistic diseases from recurring. The authors noted that AZT is expected to be approved by the Food and Drug Administration for prescription sales in early 1987. According to Burns and Groopman, the long term effects of AZT are still unknown, but since AIDS is fatal, use of AZT can be justified. The authors claimed that if a vaccine can be developed today, "it will not help the 1-million to 1.5 million persons in the U.S. and the 10-million persons worldwide who are already infected." The authors speculated that because of the broad spectrum of diseases that occur with AIDS, developing a single effective treatment may be impossible. Also, Burns and Groopman noted that the prospect of developing an effective vaccine is bleak and is probably not in reach within the next decade if at all. The authors concluded with an urgent call for government to provide monetary support for increased research into working on cures and vaccines against AIDS. The authors also made an urgent call for monetary support for improving educational efforts to inform the public on ways to protect themselves from the disease.

Indiana State Board of Health, "AZT: New Hope for AIDS Patients," ISBH AIDS Update, 1:2:1, October/November 1986.

This article reported that Burroughs Wellcome, a major drug cartel, had announced on September 19, 1986 that a new drug used in treating AIDS victims would be tested nationwide. The drug was called azidothymidine (AZT).

According to the article, AZT works by "flooding an HIV infected cell with false genetic building blocks, thus disabling the virus' ability to replicate." The article made it clear that there is no known cure for AIDS, and AZT has only been shown to have the capability of extending the lives of some victims.

"Leader Urges Caution on New AIDS Drugs." The Fort Wayne Journal-Gazette, 29 March 1987:12A.

This article reported that Jeff levi, executive director of the National Gay and Lesbian Task Force, warned homosexuals at a conference about the dangers of pressuring federal officials to release AIDS treatments that have not been fully tested. Levi explained, "clinical tests of potential AIDS treatments by the Food and Drug Administration are slow-moving and methodical, but they also help keep bad drugs from being distributed to the public." Levi indicated that, "by pushing for the early release of drugs, gays would be legitimizing the use of many gay people to test drugs with unknown consequences." Some drugs, Levi added, could shorten the lives of some AIDS patients. The article noted that AZT, sold under the trade name Retrovir, is the first drug licensed in the U.S. for the treatment of AIDS. AZT, according to the article is still considered experimental.

"Researcher Gives Self AIDS Vaccine." The Goshen News, 18 March 1987:4.

This article reported that researcher, Daniel Zagury, gave himself and several Zairan volunteers the first experimental vaccine against AIDS ever tried in humans. The vaccine was designed to stimulate the immune system into "creating defenses" against two strains of the AIDS virus. The virus used in the vaccine was genetically altered for the vaccine. The genetic alteration was done by "inserting a gene from the AIDS virus itself so that the altered virus would provoke an immune response against two strains of the AIDS virus; but, it was noted that it is not known whether the vaccine would work since Zagury and the Zairans were not actually exposed to the AIDS virus in the test to see if the resistance against the disease was gained following administration of the experimental vaccine. It remains to be seen what implications this test may have created in the search for a vaccine that would help prevent AIDS in humans. The article noted that there is no known vaccine to protect humans from AIDS, and no known cure once a victim has AIDS.

Wheeler, David L., "Testing of Vaccines Poses Ethical Dilemmas," The Chronicle of Higher Education, 33:30: 1-9, April 8, 1987.

Wheeler described several ethical dilemmas created as researchers contemplate using human subjects to test AIDS vaccines. The dilemmas were: (1) if a virus is used as part of the vaccine, the vaccine itself may be contagious, (2) determining the effectiveness of a vaccine may require risking an actual infection of the AIDS virus, (3) those vaccinated may test positive for antibodies to the AIDS which could create problems with the subject's employer and insurance company, and (4) subjects would need to be followed for a long time, perhaps decades, to learn about the long term effects of the vaccine.

Wheeler noted that the AIDS virus mutates so often that creating an effective vaccine may be impossible. Wheeler concluded by indicating that a better attack on the AIDS epidemic would be prevention through education.

AIDS: THE STATISTICS

Reported cases in U.S.

Centers for Disease Control, "Acquired Immunodeficiency Syndrome (AIDS) Among Blacks and Hispanics-United States," Morbidity and Mortality Weekly Report, 35:42:655-666, Oct. 24, 1986.

This article reported that between June 1, 1981 and September 8, 1986, the Centers for Disease Control received reports of 24,576 cases of AIDS. The article noted that of these cases, 6,192 (25%) were black, 3,488 (14%) were Hispanic, and 14,554 (60%) were white. Of the 24,576 AIDS cases reported to the CDC from June 1, 1981 to September 8, 1986, 22,468 were male AIDS patients. The article reported that black and Hispanic males accounted for 23% and 14% of the total male cases. The article noted that among women, blacks and Hispanics accounted for 51% and 21% of the 1,634 female AIDS patients.

The article used tables and graphs to depict the percentages of total AIDS cases by race and state. The article concluded that, based on the data presented, cases of AIDS are rising in all racial/ethnic groups, and in all geographic regions of the country. The article also concluded that although the highest incidences of AIDS cases are among white males, cumulative instances of AIDS among blacks and Hispanics are over three times the rate of whites.

Centers for Disease Control, "Update: Acquired Immunodeficiency Syndrome - United States," Morbidity and Mortality Weekly Report, 35:49:757-765, Dec. 12, 1986.

The Centers for Disease Control (CDC) reported statistics about the spread of AIDS in the United States from known cases in 1981 through December 8, 1986. Some of the statistics presented included: (1) 28,098 total cases of AIDS had been reported (27,704 of the cases were adults and 394 of the cases were children), (2) 15,757 total deaths from AIDS were reported (56% of the total adult cases and 61% of the total children cases), (3) the period of time required to double the number of cases reported was 13 months, (4) during the 3 months prior to December 12, 1986, an average of 58 new cases of AIDS had been reported to the CDC daily; this compared to 35 cases reported daily for the same period in 1985, 20 cases reported daily in 1984, and 10 cases reported daily in 1983, (5) 25,834 (93%) of all adult AIDS cases were men, (6) 90% of all male cases occured to those between 20 and 49 years of age, and (7) 78% of the total deaths reported (15,757) had been diagnosed as having AIDS prior to January of 1985.

The article also presented the total numbers of AIDS cases reported by sex and transmission category. The article noted that 97% of all adult AIDS patients were found to belong to the following groups: (1) homosexual and bisexual men (66%), (2) heterosexual intravenous (IV) drug users (17%), (3) homosexual and bisexual men who have used IV drugs (8%), (4) persons with hemophilia/coagulation disorders (1%), (5) heterosexual partners of persons with AIDS (4%), and (6) recipients of blood transfusions that were contaminated (2%).

Communicable Disease Control Division. Provisional AIDS Morbidity and Mortality by County. Indiana State Board of Health: 7 pp., Jan. 7, 1987.

This report presented statistical data about the spread of AIDS in the U.S. and Indiana. From 1982 through December 10, 1986, the reported cases of AIDS in the U.S. totaled 29,003. The number of reported deaths from AIDS in the U.S. totaled 16,301.

The report indicated that from 1982 through December 31, 1986, Indiana reported 136 total statewide cases of AIDS and 86 deaths.

Projections

Health and Public Committee of the American College of Physicians, The Infectious Diseases Society of America, "Acquired Immunodeficiency Syndrome," Annals of Internal Medicine, 104:575-81, 1986.

The committee presented facts about the realities of the AIDS epidemic. Facts about the epidemiology of the disease were presented, and the possibilities of finding a vaccine or an effective treatment were discussed. The committee presented estimates of the numbers of AIDS cases they felt would occur in the U.S. by 1991 and compared the estimates with 1986 figures.

The committee claimed that the number of cases of AIDS reported, as of January 1986, totaled 19,000; the committee projected that in January of 1991, the number of cases should total 196,000. The committee also claimed that the number of deaths from AIDS, as of January 1986, totaled 9,000; the committee projected that in January of 1991, the number of deaths should total 125,000.

Other projections, presented by the committee, that indicated the seriousness of the spread of AIDS included: (1) numbers of cases of heterosexual men and women with AIDS is expected to increase to nearly 7,000 by 1991, from the 1,100 reported cases in 1986, (2) numbers of cases of infants and children with AIDS is expected to increase to 3,000 by 1991, from the 410 reported cases in 1986, and (3) through 1985, fewer than 60% of cases of AIDS were reported outside of New York City and San Francisco; by 1991, more than 80% of the new cases are predicted to be reported from other states and localities.

The committee concluded, "Given the lack of an effective treatment and the absence of a vaccine, the future prevalence of AIDS will depend heavily on the success of risk-reduction programs based on public information and education." The committee also concluded that the population of persons infected with HIV will continue to increase, but at a slower rate than is currently seen.

AIDS: MISCONCEPTIONS AND APPREHENSIONS

Price, James H., et al., "High School Students' Perceptions and Misperceptions of AIDS," Journal of School Health, 55:3:107-109, March 1985.

This study examined the knowledge, beliefs, and sources of information of junior and senior high school students concerning AIDS. The study compiled responses and determined the accuracy to which 250 students from four high schools in Ohio answered questions regarding facts about AIDS. Price noted that an extensive review of the literature failed to find any prior study that examined the public's knowledge about AIDS.

Based on student responses, the study concluded the following: (1) students have a very limited knowledge about AIDS, (2) the majority of students were not personally worried about contracting AIDS, (3) the primary sources of AIDS information for students were from TV, newspapers, magazines, and radio, and (4) schools were one of the least often mentioned sources of information. Price claimed, "Since students seem to receive most of their information on AIDS from the mass media, it would appear that the schools need to strive to provide more accurate information on current health topics." The report added that "though information from the media may not necessarily be incorrect, it is frequently superficial and may provide inadequate information to students."

Indiana State Board of Health, "ISBH 1986 AIDS Information Survey Result," Indiana State Board of Health pamphlet: Indianapolis, 4pp., 1986.

The Indiana State Board of Health (ISBH) presented statistics from a survey it took to ascertain the opinions, attitudes, and knowledge about AIDS of people from 84 of Indiana's 92 counties. According to the ISBH, the poll was required as part of an educational grant from the Centers for Disease Control, which provided the list of questions that the people were asked. The ISBH noted that 4,136 people responded to the questions. The ISBH noted that the results provided a useful and valid overview of present knowledge and opinions of Indiana residents, because it included a large sample from all ages, sex, and educational backgrounds. The ISBH education staff indicated that the areas of greatest interest from the survey included people's attitudes about how AIDS is and is not transmitted, what causes AIDS, and what steps should be taken to control its spread.

Following are some of the results that interested the ISBH educational staff most: (1) 9.72% indicated they believed AIDS is caused by the wrath of God against homosexuals and others for their immoral conduct, (2) 22.92% believed AIDS could be transmitted by drinking from the same glass as an AIDS patient, (3) only 33.6% felt there was no chance of contracting AIDS from a blood transfusion, (4) 54.79% indicated they would not donate blood anymore because of fear of contracting AIDS in the donation process, and (5) 16.83% believed students with AIDS should be barred from school. The ISBH claimed that these results indicate the educational needs for Indiana. The ISBH indicated that 30% of those polled think education should be given highest priority in efforts to stop the spread of AIDS.

Reed, Sally, "AIDS in the Schools: A Special Report," Phi Delta Kappan, 67:494-498, March 1986.

Reed pointed out that even though experts agree that AIDS is not spread through "casual contact," various opinion polls indicated that a high percentage of people believe otherwise. Reed quoted opinion poll results that reveal a definite correlation between lack of knowledge about AIDS and the fear of it. These same polls indicated most people wanted to be more educated about AIDS.

Reed recommended that schools follow the guidelines set by the Centers for Disease Control (CDC) which calls for schools to educate their students about AIDS. It was noted that the CDC guidelines are being used in forming recommendations offered to member schools by the National Association of Independent Schools (NAIS), the National Education Association (NEA),and numerous state boards of education.

Hellman, Sandra L., "The AIDS Epidemic," American Association of Occupational Health Nurses Journal, 34:6:284-290, June 1986.

Hellman claimed, "The AIDS epidemic is the nation's number one health priority." Hellman supported this claim with statistics from the Center for Disease Control (CDC) that indicated that the disease had spread rapidly since the first cases were known in this country in 1981.

Hellman examined the legal and ethical issues surrounding AIDS. Connecting solid research about the transmission of the virus with public sentiment, Hellman noted, "Despite repeated medical assurances that AIDS can't be transmitted by casual contact as would occur in the worksite, concern and apprehension still exists." Hellman described a legal dilemma over AIDS that has developed; the dilemma challenges the Federal Rehabilitation Act of 1973 that prohibits discrimination of the handicapped. The act, as Hellman explained, mandates that accommmodations need to be made to meet the needs of the handicapped; that includes AIDS victims. A dilemma can arise when fearful coworkers of AIDS victims pressure their employers to discriminate against workers with AIDS, to protect themselves. Hellman noted, employers are pressured to discriminate against AIDS carriers because health insurance benefits offered by the employer become expensive. Hellman noted that AIDS patients may require medical needs costing between $19,000 to $200,000.

AIDS: THE CALL FOR EDUCATION

World Health Organization

Centers for Disease Control, "Acquired Immunodeficiency Syndrome: Meeting of the WHO Collaboratin Centers on AIDS," Morbidity and Mortality Weekly Report, 34:44:678-79, November 8, 1985.

This article reported that the World Health Organization (WHO), in collaboration with the Centers for Disease Control (CDC), met in 1985 to review the epidemiologic status of AIDS. The WHO affirmed that the disease had become a major health problem for the world. The WHO concurred with the CDC on the following issues about the disease: (1) the AIDS virus is not spread through casual contact with an infected individual, (2) blood-sucking insects can not transmit the disease, and (3) about 90% of the adult cases of AIDS in the United States and Europe are homosexual and bisexual men, intravenous drug users, and sexual partners of persons in these groups. The WHO urged nations to utilize large-scale testing for AIDS since it is the only practical method currently available to detect AIDS. The WHO argued that if more people with AIDS knew they had the disease, then more of these people could take steps to avoid spreading it further.

The WHO concluded, "The prevalence of AIDS will depend heavily on the success of risk-reduction methods used by people based on public information and education." The WHO strongly urged nations to adopt comprehensive education programs that explain the facts about how AIDS can be transmitted and how to prevent its transmission.

U.S. Surgeon General

Koop, C. Everett, "Surgeon General's Report on Acquired Immune Deficiency Syndrome," U.S. Dept. of Health and Human Services Government Printing, Washington, D.C.: 35pp., November 1986.

Koop compiled much information about AIDS from experts on his staff and summarized it in easy to understand language for the general public. The report dealt with five AIDS-related issues which included the following: (1) statistics which showed that AIDS is a serious problem, (2) methods by which AIDS is transmitted, (3) the risks of getting AIDS, (4) preventative measures to avoid infection by AIDS, and (5) the necessity for AIDS education in schools.

Koop projected that AIDS will claim 270,000 victims by 1991 at a cost of between $8 and $16 billion in health services. To control the epidemic, Koop recommended that education about AIDS "begin at the lowest grade level possible." Koop supported his recommendation by indicating that "adolescents are those whose behavior we wish to specially influence because of their vulnerability when they are exploring their own sexuality." Koop continued to admonish the need for education about AIDS by warning, "If we are to stop the AIDS epidemic, we all must understand the disease-- its cause; its nature and its prevention." Pointing to the fact that there is no cure for AIDS, Koop claimed education is the only available tool to control the spread of AIDS.

Centers for Disease Control

Centers for Disease Control, "The Effectiveness of School Health Education," Morbidity and Mortality Weekly Report, 35:38:593-595, September 26, 1986.

The Centers for Disease Control (CDC) conducted a study called the School Health Education Evaluation (SHEE) to determine the effectiveness of health education in schools. More than 30,000 fourth through seventh-grade students from 1,071 classrooms in 20 states were included in the study. The CDC concluded the following from the study: (1) children exposed to health education showed increased knowledge, healthier attitudes, and better health skills and practices than those who did not receive health education, (2) the most effective curriculums are in those areas emphasized by developers and believed by teachers to be most important, and (3) large effects on specific program knowledge were achieved in relatively few classroom hours.

The article presented data that supported the following conclusions about the effectiveness of health education: (1) school health education curricula can effect changes in health-related knowledge, practices, and attitudes, and that such changes increase with amount of instruction, (2) if all students in the United States had been exposed to the School Health Curriculum Project (SHCP), most likely 146,000 students would not have begun to smoke in the seventh grade, (3) use of health education curricula in schools may substantially contribute to the nation's health, and (4) the SHEE "demonstrated that school health education provides effective means of helping children improve their health knowledge, develop healthy lifestyles, and can decrease the likelihood that children will adopt behavior that is hazardous to their health."

Scientific community

Institute of Medicine, National Academy of Sciences. Mobilizing Against AIDS: The Unfinished Story of a Virus. Cambridge, Mass., London: Harvard Press, 1986.

This book was based on a composite of ideas about AIDS presented by experts at a meeting for members of the Institute of Medicine (IOM) and the National Academy of Sciences (NAS). The book described the spread of AIDS throughout the United States and the world. The book discussed the spectrum of diseases that commonly afflict AIDS victims and it described how the AIDS virus destroys the immune system.

The book discussed the potential for creating a vaccine or an effective drug treatment to counter the AIDS virus. The IOM-NAS claimed that the prospects for finding a cure in the near future are bleak. The IOM-NAS concluded, "The only certainty is that education and other public health measures are now the only method available to control transmission of AIDS."

Institute of Medicine and National Academy of Sciences, "Cronfronting AIDS: Directions for Public Health, Health Care, and Research," Issues In Science and Technology, 3:2:92-101, Winter 1987.

In this article, writers for the Institute of Medicine (IOM) and the National Academy of Sciences (NAS) presented data and conclusive evidence from IOM-NAS research which supported their urgent call to government to spend $1 billion annually on AIDS education programs and public health expenditures by 1990. The IOM-NAS argued that "an effective vaccine may be very difficult, if not impossible, to produce." The IOM-NAS indicated that much money will need to be spent over the next decade if research into finding an effective treatment or cure for AIDS is going to have a chance to be successful. The IOM-NAS also presented statistical data that showed that the AIDS epidemic had spread rapidly since 1981.

The IOM-NAS urged government to provide the monetary resources necessary to purchase advertising time on television and to run advertisements in major newspapers to educate people about how they can prevent themselves from becoming infected with the HIV. The IOM-NAS argued, "The President should take strong leadership in the effort against AIDS, ensuring that the financial, human, and institutional resources needed to combat HIV infection and care for AIDS patients are provided."

The IOM-NAS addressed the responsibilities of public education in contributing to the control of the spread of HIV. The IOM-NAS claimed, "For at least the next several years, the most effective measure for significantly reducing the spread of HIV infection is education." The IOM-NAS urged educators to "be prepared to specify that intercourse-anal or vaginal- with an infected or possibly infected person and without the protection of a condom is very risky." The IOM-NAS suggested that "educators use whatever vernacular is required for that message to be understood." The IOM-NAS urged that education is necessary to "induce, persuade, or motivate people to avoid transmission of HIV."

Piel, Jonathan, "Science and the Citizen: The AIDS Pandemic," Scientific American, 256:58-59, Jan. 1987.

Piel described the AIDS virus and the spread of the disease. In this article, Piel presented statistics about the AIDS epidemic and discussed the possibilities of controlling the disease.

Piel praised researchers for the speed at which they worked to produce documented information about the AIDS virus and the epidemiology of the disease. Piel also hailed the U.S. Surgeon General, the United Nations' World Health Organization, the Institute of Medicine, and the National Academy of Sciences for their efforts in research of AIDS as well as their efforts in funding important educational programs to inform th public about AIDS in efforts to control the spread of the disease.

Piel speculated that because of the "mutability" of the AIDS virus, developing a vaccine is difficult. Piel cautioned that because the AIDS virus can lie dormant in cells for years, it is difficult to predict the national or global course of the epidemic. Piel concluded that education is the only sure tool to use to counter the spread of AIDS since vaccines are still only a dream for the future.

Bennett, Alice, "Introduction to AIDS." AIDS: Educating the Public. Indiana Academy of Science pamphlet: Indiana State Library, pp.1-2, November 1986.

Bennett reported that, until recently, it had appeared that AIDS would be confined to homosexuals and drug users in large metropolitan areas. Bennett indicated that these are indeed the two highest risk groups, but it is clear that AIDS is a disease that is threatening the entire population. In support of this fact, Bennett reported that Indiana's first case of AIDS was reported in 1982, and since then 117 cases had been reported in the state. Nationwide, Bennett reported that as of November of 1986, over 26,000 cases of AIDS were recorded. Bennett claimed that it is projected that more than 270,000 cases will be reported by 1991, with deaths expected to reach 179,000.

Without a cure or effective treatment for AIDS, Bennett indicated that it is essential that the public become educated about the nature of the disease and methods of preventing its spread. Bennett noted that "approaches to controlling AIDS must be based on information." Bennett also concluded that without education, "the dread and stigma associated with AIDS can lead to measures that impact on the civil liberties of individuals in schools and in the work-place."

State

Meyers, Woodrow A., Jr., Letter to School Superintendents of Indiana. 6 March 1987.

The Indiana State Board of Health Commissioner claimed, "AIDS is one of the United States most serious health problems." Meyers indicated "Since there is no cure or effective treatment for AIDS, the best way to address the problem is through education." Meyers also claimed, "Proper factual eduation about AIDS in the school setting must reach all young adults if we are to reduce the number of cases in the future."

Meyers urged Indiana school Superintendents to implement the AIDS curriculum that was recently developed by Dr. William Yarber of Indiana University into the health education curriculum of junior and senior high schools. Meyers claimed, "Yarber's curriculum offers schools an effective way of providing this information to students."

Yarber, William L., "AIDS: What Young Adults Should Know," Indiana State Board of Health Curriculum, 44 pp., 1987.

Yarber presented an AIDS curriculum he developed to assist teachers when they present AIDS in junior and senior high school classrooms. The stated goal of the curriculum was to "prepare individuals to protect themselves and others from infection." The curriculum was developed to "provide effective instructional resources and learning opportunities that address knowledge, attitudes, and skills to affect voluntary adoption of health-conducive behavior." Yarber argued that teaching youth about AIDS is important since nearly half (10 million) of those infected by sexually transmitted diseases are under the age of 25.

Indiana State Board of Health. Indiana AIDS Prevention, 1987. Indiana State Board of Health pamphlet: Indianapolis, 31 pp., January 1987.

In this report, the Indiana State Board of Health (ISBH) described the epidemiology of AIDS in Indiana, explained ISBH goals concerned with controlling the spread of the disease, and presented an overview of the ISBH AIDS Education program. The report also presented over 60 pages of updated statistics, epidemiological data, and guidelines for handling AIDS victims.

As of January 1987, the ISBH reported over 29,000 cases of AIDS and 17,000 deaths due to AIDS in the United States. The ISBH indicated that in Indiana, 136 cases of AIDS have been reported, and 84 of those cases have resulted in death. The ISBH also reported that the numbers of AIDS cases, at present rates, will double in 13 months. Using these statistics, the ISBH announced, "Education is our most effective means of prevention," The report described a comprehensive plan by which the ISBH has been following to educate target groups about AIDS. Among the groups that the ISBH had designated as target groups for education efforts were: (1) high risk groups, (2) physicians, (3) nurses, (4) health care workers, (5) school personnel, (6) university personnel, (7) minority groups, and (8) employers.

The main portion of the ISBH report dealt with the "education as prevention" philosophy; the ISBH stated that its goal is to "educate every citizen in Indiana about AIDS" to control the spread of AIDS. In reference to public schools, the ISBH stated that, "After careful consideration of all the factors involved, it is the position of the Indiana State Board of Health that the Surgeon General's recommendations regarding education programs in the public schools should be implemented." The ISBH concluded, "Failure to make our children aware of this deadly disease and the behaviors which will increase their risk of acquiring it would be a grave error of omission."

Baker, Lou Ann, "Education in the State." AIDS: Educating the Public. Indiana Academy of Science pamphlet: Indiana State Library, pp.9-11, November 1986.

Baker claimed that nationwide,"public apprehensions have fueled an incredible appetite for AIDS information." Baker explained that her position with the Indiana State Board of Health was formed as part of an effort to increase public awareness about AIDS. According to Baker, the ISBH had announced that statewide education about AIDS is a major priority. Baker claimed the ultimate goal of the ISBH is to "educate all Hoosier citizens about AIDS."

Baker concluded that AIDS education is one of the most important tools for controlling the spread of AIDS since there is no cure for the disease as yet. Baker argued that education helps eliminate many of the misconceptions that have led to unnecessary fear or acts of discrimination towards AIDS victims. Baker reported that the ISBH received over $380,000 in federal appropriations through the Center of Disease Control (CDC) to support AIDS-related activity. Baker noted that $156,000 of this money is specifically for AIDS education programs in Indiana.

Dodson, Donna, "Educating the Community." AIDS: Ecucating the Public. Indiana Academy of Science pamphlet: Indiana State Library, pp.5-8, November 1986.

Dodson reported that if present rates continue, the Centers for Disease Control (CDC) would be correct in projecting that 270,000 cases of AIDS and 149,000 deaths from AIDS will occur by 1991. Dodson also reported that cases of AIDS among heterosexual groups are expected to increase to 9% by 1991. Also, Dodson indicated that AIDS is not just a problem for large metropolitan areas because more than 80% of the new AIDS cases are predicted to occur in other states and localties far removed from large cities like New York and San Francisco. In light of these facts, Dodson pointed out the need for public education about prevention if the epidemic is to be brought under control. Dodson concluded that schools need effective AIDS policies based on various health authority recommendations. Dodson urged schools to adopt AIDS education in the curriculums of all the levels of education. Dodson defended these conclusions by indicating that an "informed public" is better armed to control the spread of AIDS.

Local

Steffen, Wayne, "AIDS Community Action Group At Work." The Goshen News, 19 March 1987:12.

This article reported on the goals that had been adopted by the Elkhart County AIDS Community Action Group of Indiana. The chairperson of the organization, John Frybort, argued that until AIDS spreads fiercely into the general population, the efforts made by society to push for finding a cure for AIDS, mandating AIDS education, and caring for AIDS victims will be largely ignored. Frybort noted that AIDS has spread "from its traditional base to infect over a million people nationwide including heterosexuals, blacks, and hispanics."

Reflecting upon the seriousness of the AIDS epidemic, Frybort claimed that, "It became clear there was far too much to do to educate the community on AIDS so we brought in people from other disciplines such as doctors, nurses, lawyers, and social service agencies." Frybort indicated that education is the key to beating AIDS. Frybort claimed education can stop the spread of AIDS. Frybort concluded that effective educational efforts by schools and general public information campaigns need to carry these two messages: (1) AIDS is spread mainly by having sex or sharing needles with an AIDS carrier, and (2) condoms can help prevent AIDS but avoiding sex with strangers is best.

Hooper, Susan, "AIDS and the Public Schools, "Leadership Reports: National School Board Association, 1:3-55, 1986.

This report presented a comprehensive review of the medical facts about the effects of AIDS and how the disease is transmitted. The report presented statistics that support the conclusion that AIDS has reached epidemic status and is continuing to spread. The report reviewed the legal implications of AIDS in the school setting. The report also presented an overview of some of the school board policy responses to AIDS that various school districts across the nation had adopted.

The report presented facts about AIDS to "dispel existing misconceptions about the disease that have caused unnecessary fear" among school boards, school administrators, teachers, parents, and students. The report emphasized that AIDS is not spread by the casual contact that occurs between people in the school setting.

The report claimed that students with AIDS are protected by the Education For All Handicapped Children Act. The report indicated that this law protects all handicapped, including those with AIDS, from being discriminated against by schools. The report presented AIDS policies used by several schools in the country, and urged all schools to make similar policies to those presented. The report recommended that schools make similar policies to those presented. The report recommended that schools make arrangements to educate students afflicted with AIDS in school. The report urged schools to educate all other students, faculty, and parents with the facts about AIDS to allay any unnecessary fear associated with the presence of students afflicted with AIDS.

The report recommended that AIDS curriculums be incorporated into health education programs of schools to inform students about the disease, how it is spread, and to allay any misconceptions that may exist about the disease. The report concluded that schools are obligated to teach students who have AIDS, and to inform other students about AIDS so they can choose life styles that will protect them from the disease.

McCormick, Kathleen, "AIDS Instruction Becomes a Troubling Test of Courage for Local School Boards," The American School Board Journal, 174:3:25-30, March 1987.

In this article, McCormick urged teachers and administrators who might be reluctant participants in an AIDS education program to "overcome their social discomfort, embarrassments, and biases" and teach students about AIDS. McCormick argued that it is the responsibility of educators to "protect the lives and health of all students." McCormick explained, "the dire projections about AIDS and the number of victims the epidemic might claim from today's youth allow teachers and administrators no alternative." McCormick noted that curriculums about AIDS need to include specific information about the AIDS virus, how it is transmitted sexually, and how it can be transmitted by sharing needles with infected persons during usage of intravenous drugs. McCormick concluded that curriculums about AIDS should be used in junior and senior high schools. Also, McCormick suggested that each school needs to decide to what lower grades they are willing to present information about AIDS.

Leo, John, "Sex and Schools," Time 128:21:54-63, November 24, 1986.

Leo examined parental attitudes about AIDS and sex education in the United States. Leo reported statistics from various surveys conducted in 1986 which questioned parents about their opinions on whether AIDS should be discussed in the classroom.

Leo concluded from the survey results that the AIDS epidemic has caused many parents to "rethink their positions regarding the importance and utter necessity of sex education in schools." Leo also concluded that as the AIDS epidemic spreads, schools will feel more pressure to teach sex education, and to teach the specifics about how AIDS is transmitted and how students can protect themselves from the disease.

SUMMARY

Gallo, Wheeler, and Rhine reported that the scientific community decided to assign the virus that causes AIDS the generic name human immunodeficiency virus (HIV). Gallo noted that since the discovery of the HIV in 1981, many names had been given to the virus by various researchers around the world. Rhine indicated that because there were so many different names for the virus, a single generic name was needed.

Bardell claimed that biology teachers need to know the "biological nature" of the HIV to explain the disease in the classroom. Bardell and Rainis noted that the HIV belongs to the retrovirus family. Bardell and Rainis explained that the HIV is spherically shaped and it uses an enzyme called reverse transcriptase to transcribe its RNA into DNA. Bardell and Rainis pointed out that retroviruses are different from all other forms of life because of their ability to make DNA from RNA by using their unique reverse transcriptase enzyme. They explained that all other life forms make RNA from DNA and do not have reverse transcriptase enzyme.

Bardell, Tortora, Rainis, and Gallo described how the HIV attacks cells in the immune system. Rainis and Gallo noted that once in the bloodstream, the HIV can bind to a T4 cell. Bardell, Tortora, Rainis, and Gallo indicated that once the HIV has infected the T4 cell, its protective envelope is removed. Next, Rainis and Gallo noted that the viral RNA and the reverse transcriptase enzyme of the virus enter the T4 cell. Tortora, Rainis, and Gallo explained that by using the reverse transcriptase enzyme, the viral RNA is reverse transcribed into forming a double stranded DNA molecule. Bardell, Tortora, Rainis, and Gallo

indicated that this newly formed DNA molecule enters the T4 cell nucleus and integrates itself with the DNA of the T4 cell. Tortora stated that when viral DNA has integrated itself with host cell DNA, it is called a provirus. Bardell, Tortora, Rainis, and Gallo explained that when the T4 cell is activated to reproduce, the viral DNA (provirus) will be transcribed as well, thus new viral RNA chains will be produced. Tortora and Rainis indicated that some of the newly produced viral RNA will become genome RNA for the new viral progeny. They pointed out that the other RNA will become mRNA to make capsid proteins, which will cover the genome RNA in the new viral progeny. Next, Rainis indicated that the newly produced viral RNA and reverse transcriptase enzyme are packaged into the new capsid and envelope. Rainis and Gallo explained that the life cycle ends when the new HIV progeny bud from the T4 cell causing the T4 cell membrane to burst. Rainis and Gallo pointed out that when the T4 cell wall bursts, the cell dies.

Rainis stated that the body "acquires an immune deficiency problem" when T4 cells are destroyed. Bardell called this situation an "acquired immunodeficiency" problem. Bardell, Rainis, Laurence, and Pike explained that T4 cells are needed to stimulate B-cells into producing antibodies which attack microbes that enter the body. Pike stated, "Without proper numbers of healthy T4 cells, B-cells will not be stimulated into producing the antibodies necessary to fight off pathogens or foreign particulates that enter the body." Laurence reported that the reason the HIV attacks the T4 cell is because the T4 cell has the right kind of protein receptor cite for the virus to attach to. Laurence also indicated that brain cells, spinal fluid, and some epithelial tissues also have receptor cites for the HIV.

Gallo, Laurence, and Bardell noted that the HIV gene code for the envelope it produces mutates so often that finding a vaccine that can handle all of the HIV types may be impossible. Gallo stated that if a workable vaccine could be made, it must be capable of stimulating B-cells into producing antibodies that can bind to the HIV envelope to prevent it from attaching to a T4 cell. Gallo also noted that an effective vaccine must also be capable of killing cells already infected by the virus. Burns and Groopman speculated that the prospect of developing an effective vaccine is probably not in reach within the next decade, if at all.

Burns, Bardell, and Laurence pointed out that because the HIV thrives in the nucleus of host cells, drugs that could attack the HIV would also attack the host cell since the HIV is in the DNA of the host cell. Laurence stated that present drug treatments include the use of Suranim and Ribafrin. Laurence indicated that these drugs work by inhibiting the reverse transcriptase enzyme used in viral replication. Laurence pointed out that these drugs are like most antiviral drugs, in that they destroy or inhibit important cells in the immune system which can make them counterproductive to the body. Burns and Groopman speculated that because of the broad spectrum of diseases that occur with AIDS, the development of a single effective drug treatment may be impossible.

Tortora noted that in 1981, it was discovered that something was spreading through society and causing immunosuppression. Pike and Tortora indicated that the immunosuppression problem was first realized by the Centers for Disease Control (CDC). They explained that the CDC had noticed an increase in the number of reported cases of the rare oppor-

tunistic diseases called Pneumocystis carinii pneumonia (PCP) and Kaposi's sarcoma (KS). Pike indicated that Kaposi's sarcoma ordinarily affected old Jewish men from the Mediterranean. Tortora stated that these diseases usually affect elderly and immunosuppressed people. Pike and Tortora explained that since many of those who had developed PCP and KS were young adults and children, the CDC concluded that something was causing an immunosuppression problem in society. Tortora stated that this newly identified condition afflicting people was named "acquired immune deficiency syndrome."

Laurence and Pike asserted that the HIV attacks T4 cells. They explained that without T4 cells, a state of immunosuppression occurs because T4 cells are needed to stimulate B-cells into producing the antibodies that fight disease. Laurence stated that AIDS patients typically show a huge decline in T4 cells. Pike and Laurence explained that when people have acquired immunodeficiency syndrome (AIDS), opportunistic diseases that ordinarily do not afflict people with healthy immune systems can occur.

Gallo, Pike, Quinn, Farthing, and the CDC stated that the two most common fatal opportunistic diseases that afflict victims of AIDS are PCP and KS. Farthing added that the third most common opportunistic disease is lymphoma.

The Communicable Disease Control Division (CDCD) claimed, "For a person to be diagnosed as having AIDS, he or she had to have a disease that was indicative of an underlying cellular immunodeficiency..." The CDCD added that the following diseases can suggest immunodeficiency: (1) Kaposi's sarcoma, (2) PCP, (3) lymphoma of the brain, (4) Cryptosporidosis,

(5) Strongyloidosis, (6) Toxoplasmosis, (7) Aspergillosis, (8) Candidasis, (9) Cryptococcosis, (10) any atypical bacterial infection, (11) Cytomegalovirus infection, (12) herpes infection, and (13) Leukoencephalopathy.

Tortora, Pike, and the Communicable Disease Control Division noted that the clinical symptoms of AIDS include: (1) fever, (2) weight loss, (3) lymphadenopathy, (4) diarrhea, (5) fatigue, and (6) night sweats. The CDCD stated that if these symptoms last three or more months and any two of the following laboratory abnormalities also occur, then the diagnosis of AIDS may be concrete. The laboratory abnormalities suggested by the CDC that can be indicative of AIDS included: (1) depressed T-helper cells, (2) depressed helper/suppressor ratio, (3) at least one of the following: leukemia, thromacytopenia, absolute lymphopenia, (4) elevated serum globulins, (5) depressed blastogenesis, and (6) abnormal skin tests.

Miller discovered that some psychologically vulnerable people can harbor psychiatric symptoms associated with the fear of AIDS. He explained that the fear of AIDS can become so great in some people that physical changes brought on by depression can mimic the early stages of AIDS.

The U.S. Public Health Service reported that 98% of all the reported cases of AIDS in the U.S. since 1981 have occurred to people from the following groups: (1) sexually active homosexuals and bisexual males who have had sex with another man since 1977 (65%), (2) present or past abusers of illicit intravenous (IV) drugs (17%), (3) homosexual and bisexual men who are also IV drug abusers (8%), (4) heterosexual men and women having sex with an AIDS carrier (4%), (5) persons who have received transfusions or blood products (2%), (6) persons with hemophilia or other

blood clotting disorders who have received blood clotting factors (1%), and (7) infants born to mothers infected with the HIV (1%). The CDC and the U.S. Public Health Service indicated that the two most common ways the HIV can be transmitted is through intimate sexual contact and sharing needles with an infected person when using IV drugs. Pike and Quinn noted that the most common mode of transmission in Africa is through heterosexual activity. Quinn added that the immunopathologies of AIDS infection are the same regardless of the mode of transmission.

The U.S. Public Health Service pointed out that the HIV has been isolated from blood, semen, vaginal secretions, saliva, urine, breast milk, and tears. Gallo added that the HIV has also been isolated from plasma.

The U.S. Public Health Service, Black and Lusby, emphasized that AIDS can not be spread through casual contact. Lusby noted that not a single case of AIDS has been contracted from contact with contaminated saliva or tears. Black added that no cases of HIV infection in the U.S. are known to have been transmitted in school, day care, or other person-to-person contact. The U.S. Public Health Service explained that studies have indicated that the virus can only be transmitted when body fluids are shared during sex and from exchanging blood.

The CDC urged women infected with the HIV to avoid becoming pregnant, because the HIV can be transmitted to the fetus or offspring during pregnancy, labor, delivery, or shortly after birth through breast milk.

The CDC reported that persons who have received blood transfusions contaminated with the HIV can transmit it to their sexual partners or newborn. Commenting on hemophilia-associated AIDS, the CDC indicated

that since the mandatory screening of all blood and blood products was implemented, the chance of contaminated blood reaching the blood supplies has been significantly reduced.

Black explained that schools have little to worry about when admitting students with AIDS. He added that the opportunistic infections of AIDS patients pose no risk to their "immunologically normal" classmates. Black stated that despite the fact that no known case of AIDS infection has been known to occur during casual person-to-person contact, a "theoretical" potential for transmission of the HIV exists for preschool aged children that bite or lack control of their body secretions. Black urged schools to form policies that advise the use of ordinary precautions in handling students with AIDS. Because of the "theoretical" potential for transmission of the HIV, Black suggested that preschool children with AIDS be given an alternative education outside the classroom.

The CDC argued that if more people who are infected with AIDS realized they were infected, than they could take measures to avoid transmitting it. The CDC recommended that more test sites guaranteeing anonymity should be set up. The CDC argued that under these conditions, more people would take the test.

The U.S. Public Health Service and the CDC urged people to avoid making sexual contact with multiple partners or with persons who have been sexually active with multiple partners, and avoid the use of IV drugs or the practice of sharing needles or syringes with others. The CDC stressed that individuals should avoid sexual practices that permit the exchange of blood, semen, urine, feces, saliva, and vaginal secretions, if they have sex with an AIDS carrier. The U.S. Public Health

Service and the CDC stressed that using condoms can help prevent the transmission of AIDS. The U.S. Public Health Service urged everyone choosing to have sex with IV drug abusers, homosexuals, bisexuals, or prostitutes to use condoms and avoid anal sex. The U.S. Public Health Service noted that anal sex causes body tissue damage which increases the chances for the HIV to enter the bloodstream.

The U.S. Public Health Service suggested those testing positive for HIV infection to tell all the people they had sex with or whom they shared IV drug needles or syringes with about the test result, and urge them to be tested as well. The U.S. Public Health Service added that people who tested positive for AIDS should avoid sex. Those choosing to have sex were urged to use condoms and prevent the passage of all body fluids to their partners. The U.S. Public Health Service also urged people who tested positive for AIDS to ensure that they do not share toothbrushes, razors, or any other item that can draw blood with anyone, and to avoid donating any blood, organs, plasma, sperm, and body tissue.

The CDC noted that health care workers are at greatest risk of infection because of the potential for "needlestick" injuries. Lusby, the CDC, and the U.S. Public Health Service urged health care workers to take precautions to avoid needlestick injuries and contact with body fluids of AIDS patients.

The CDC stressed that there is no known risk of AIDS virus transmission at offices, schools, factories, and construction sites because the HIV is a bloodborne, sexually transmitted disease that is not spread by casual contact or through food preparation or serving of food and

beverages. The CDC claimed that unless workers have other infectious diseases, they should not be restricted from work.

The U.S. Public Health Service urged gay and bisexual men to use the following preventative measures to avoid transmission of the HIV: (1) use condoms, (2) avoid sexual practices that may cause injury or rips in tissue, such as anal intercourse, (3) avoid oral-genital contact, (4) avoid open-mouthed intimate kissing, (5) avoid contact with any body fluids, (6) avoid sex with multiple partners, (7) avoid sex with people who inject drugs, (8) do not donate blood, organs, sperm, or tissues, (9) do not inhale nitrates, and (10) have blood tested regularly for HIV infection.

Crosson and Hooper claimed that Section 504 of the Vocational Rehabilitation Amendments of 1973 and the Education for All Handicapped Children Act of 1975 stipulate that "infected children may not be denied public educational services..." Regarding AIDS, Crosson explained that the greatest risk to schools is the potential for legal action taken by employees, parents, or susceptible children. Crosson urged schools to "implement procedures and face the associated risks in the interest of assuring each child's right to an education." Price recommended that schools: (1) protect the confidentiality of students with AIDS, (2) allow students with AIDS to eat in the cafeteria with their peers, (3) excuse students with AIDS from vaccinations, since their immune systems are impaired, and (4) provide a strong AIDS curriculum. Price added, "Prevention through education is the best weapon against AIDS."

Burns and Groopman presented evidence that indicated that finding a vaccine to prevent AIDS and developing an effective drug to treat AIDS

is not likely in the next decade. Wheeler, Burns, and Groopman urged the government to provide monetary support for further research and to improve the educational efforts that inform the public on ways to protect themselves from AIDS.

Burns, Groopman, and the Indiana State Board of Health (ISBH) reported that a drug called azidothymidine (AZT) has shown the capability to prolong the life of some AIDS patients. Burns and Groopman explained that it was learned that AZT inhibits reverse transcription of HIV in the lab. ISBH noted that AZT works by "flooding an HIV infected cell with false genetic building blocks, thus disabling the virus' ability to replicate." Burns, Groopman, and ISBH stressed that AZT is not a cure for AIDS; they explained that AZT has only proven to be capable of prolonging the life of some AIDS patients. Burns and Groopman indicated that the long-term effects of AZT are unknown, but early use of AZT can be justified since AIDS is fatal.

Wheeler described ethical dilemmas that have come up as researchers contemplate using human subjects to test experimental AIDS vaccines. Wheeler indicated that if a virus is used as part of the vaccine, the vaccine itself may be contagious. Wheeler described a dilemma that can be created if subjects need to be intentionally infected with the HIV to determine the effectiveness of the vaccine. Wheeler concluded that since the HIV mutates so often, creating an effective vaccine may be impossible. Wheeler stressed that a better attack on the AIDS epidemic would be prevention through education.

The CDC reported statistics that indicate that the AIDS epidemic has continued to spread throughout the United States. The CDC indicated

that during the three months prior to December 12, 1986, an average of 58 new cases of AIDS had been reported each day. The CDC compared this to the same period of time in 1985 when an average of 35 cases were reported each day. The CDC reported that the number of reported cases of AIDS, as of December 8, 1986, totaled 28,098. The CDC claimed that the number of AIDS cases will double in about 13 months from that time. The Communicable Disease Control Division of the Indiana State Board of Health reported that, as of December 31, 1986, Indiana had 136 total statewide cases of AIDS reported and 86 deaths from the disease.

The Health and Public Committee of the American College of Physicians projected that by January of 1991, the number of AIDS cases in the U.S. should total 196,000. The committee also projected that the number of deaths from AIDS should total 125,000. The committee added that by 1991, more than 80% of the new cases of AIDS are predicted to be from areas outside of New York and San Francisco. The committee concluded, "Given the lack of an effective treatment and the absence of a vaccine, the future prevalence of AIDS will depend heavily on the success of risk-reduction programs based on public information and education."

Price concluded from a study of high school student responses that the majority of high school students know little about AIDS and are not worried about contracting AIDS. Price noted that students responses indicated that their primary source for information about AIDS came from the mass media. Price indicated schools were one of the least often mentioned sources. Price claimed, "Though information from the media may not necessarily be incorrect, it is frequently superficial

and may provide inadequate information to students."

The ISBH conducted a survey to ascertain the opinions, attitudes, and knowledge about AIDS among Indiana residents. The ISBH found that 30% of those polled think education should be given highest priority in stopping the spread of AIDS. According to the ISBH, results from the survey indicate the specific areas where ISBH educational efforts need to be directed to allay the misconceptions that exist among Indiana citizens.

Reed pointed out that even though experts agree that AIDS is not spread through "casual contact," various opinion polls indicate a high percentage of people believe otherwise. Reed described that the poll results indicate a direct correlation between lack of knowledge about AIDS and a fear of it. Reed added that most people wanted to be more educated about AIDS. Reed recommended that schools follow CDC guidelines and educate students about AIDS.

Hellman noted, "Despite repeated medical assurances that AIDS can't be transmitted by casual contact at the worksite, concern and apprehension still exist." Hellman explained that because of these apprehensions and despite the Federal Rehabilitation Act of 1973 that prohibits discrimination of the handicapped, AIDS victims are being discriminated against by employers reacting to pressure from fearful co-worker of AIDS victims.

The World Health Organization (WHO) strongly urged nations to adopt comprehensive education programs that explain the facts about how AIDS can be transmitted and how to prevent its transmission. After reviewing the epidemiological status of AIDS, the WHO concluded, "The prevalence

of AIDS will depend heavily on the success of risk-reduction methods used by people based on public information and education."

The U.S. Surgeon General claimed that by 1991, AIDS will claim 270,000 victims at a cost of between $8 and $16 billion in health services. To control the epidemic, Koop recommended that education about AIDS "begin at the lowest grade level possible." Koop added that "adolescents are those whose behavior we wish to especially influence because of their vulnerability when they are exploring their own sexuality." Pointing to the fact that there is no cure for AIDS, Koop claimed education is the only available tool to control the spread of AIDS. Koop warned, "If we are to stop the AIDS epidemic, we all must understand the disease - its cause, its nature, and its prevention."

The CDC conducted a study called the School Health Education Evaluation (SHEE) to determine the effectiveness of health education in schools. The CDC found that children exposed to health education showed increased knowledge, healthier attitudes, and better health skills and practices than those who did not receive health education. As an example of how health education instruction can effect change, the CDC presented evidence that indicated that 146,000 seventh graders would not have begun to smoke if all students in the U.S. could have been exposed to the School Health Curriculum Program (SHCP). The CDC concluded that the SHEE "demonstrated that school health education...can decrease the likelihood that children will adopt behavior that is hazardous to their health."

The Institute of Medicine and the National Academy of Sciences (IOM - NAS) claimed that the prospect for finding a cure for AIDS in

the near future is bleak. The IOM - NAS concluded, "The only certainty is that education and other public health measures are now the only method available to control transmission of AIDS." The IOM - NAS also concluded, "For at least the next several years, the most effective measure for significantly reducing the spread of HIV infection is education."

The IOM - NAS urged educators to "be prepared to specify that intercourse - anal or vaginal - with an infected or possibly infected person and without the protection of a condom is very risky." The IOM - NAS also suggested that "educators use whatever vernacular is required for that message to be understood." The IOM - NAS pointed out that education is necessary to "induce, persuade, or motivate people to avoid transmission of HIV.

Piel speculated that because of the "mutability" of the HIV, developing a vaccine is difficult. Piel concluded that education is the only sure tool to use to counter the spread of AIDS since vaccines are still only a dream.

Bennett noted that AIDS is a disease that is threatening the entire population. Bennett stated that "approaches to controlling AIDS must be based on information." Bennett concluded that without education, "the dread and stigma associated with AIDS can lead to measures that impact on the civil liberties of individuals in schools and in the work-place."

The Indiana State Board of Health Commissioner stated, "Since there is no cure or effective treatment for AIDS, the best way to address the problem is through education." The Commissioner stressed, "Proper factual education about AIDS in the school setting must reach young adults if we are to reduce the number of cases in the future."

Yarber developed a curriculum to assist junior and senior high school teachers in presenting important information about AIDS. Yarber claimed the curriculum helps "prepare individuals to protect themselves and others from infection." Yarber argued that teaching youth about AIDS is important since nearly half (10 million) of those infected by sexually transmitted diseases are under the age of 25.

The ISBH announced, "Education is our most effective means of prevention." The ISBH reported that because of the seriousness of the epidemic, it has adopted the goal of "educating every citizen in Indiana about AIDS" to control its spread. The ISBH concluded, "Failure to make our children aware of this deadly disease and the behaviors which will increase their risk of acquiring it, would be a grave error of omission."

Baker indicated that nationwide, "Public apprehensions have fueled an incredible appetite for AIDS information." Baker argued that education helps eliminate many of the misconceptions that have led to unnecessary fear or acts of discrimination towards AIDS victims.

Dodson indicated that 80% of the new AIDS cases by 1991 will occur in states and localities far removed from large cities, such as New York and San Francisco. Dodson urged schools to adopt AIDS education in the curriculums of all the levels of education. Dodson claimed, an "informed public" is better armed to control the spread of AIDS.

Hooper presented facts about AIDS to "dispel existing misconceptions about the disease that have caused unnecessary fear" among school boards, school administrators, teachers, parents, and students. Hooper claimed schools are obligated by law to educate students with AIDS. Hooper recommended that AIDS curriculums be incorporated into health

education programs of schools to inform students about the disease, how it is spread, and to allay any misconceptions that may exist about the disease.

McCormick urged teachers and administrators who might be reluctant participants in an AIDS education program to "overcome their social discomfort, embarrassments, and biases" and teach students about AIDS. McCormick argued that it is the responsibility of educators to "protect the lives and health of all students." McCormick claimed curriculums about AIDS need to include specific information about the AIDS virus, and how it is transmitted.

Leo examined the parental attitudes about AIDS and sex education in the United States. Leo concluded that the AIDS epidemic has caused many parents to "rethink their positions regarding the importance and utter necessity of sex education in schools." Leo also concluded that as the AIDS epidemic spreads, schools will feel more pressure to teach sex education and to teach the specifics about how AIDS is transmitted and how students can protect themselves from the disease.

CONCLUSIONS

Acquired immunodeficiency syndrome (AIDS) is a contemporary disease. Scientists have learned much in a relatively short period of time about the disease and its causative agent, the human immunodeficiency virus (HIV). The research indicated that scientists know that the HIV is unique to all other life forms because it makes DNA from RNA by using the reverse transcriptase enzyme. Scientists are able to explain many intricate details about the life cycle and biological nature of the HIV. The research indicated that the scientists know that the HIV infects T4 cells found in the blood of humans when it gains entrance into the bloodstream. The research also noted that the HIV carries out its replication in the T4 cells, and in the process of the HIV progeny budding from the T4 cell the T4 cell bursts open and dies. The research documented that scientists know that without T4 cells, antibodies that fight off disease will not be produced because T4 cells are needed to stimulate B-cells into producing antibodies. Scientists pointed out that a state of immunodeficiency occurs and many opportunistic diseases that do not ordinarily afflict people with healthy immune systems arise and ultimately cause the demise of the victim infected.

The research revealed two disturbing features about the HIV. The gene code for the production of the envelope of the HIV mutates so often that it is difficult to produce a vaccine that can handle all the different types of HIV produced. Also, because the HIV thrives in the DNA of host T4 cells it is difficult to find a drug that can attack the HIV without also killing the host cells. Despite the many successes in discovering some of the tiniest details about the biological nature of

the HIV, scientists have been unable to find an effective cure for AIDS.

The statistics indicated that the AIDS epidemic has continued to spread throughout all of society. Projections indicated that AIDS will have claimed over 125,000 lives by 1991.

The grim statistics coupled with the fact that there is no cure for AIDS has created fear and anxiety in society. The research indicated that many people harbor misconceptions about the disease and that people have reacted to their fear and lack of knowledge about AIDS by unnecessarily discriminating against workers and students who have AIDS. The research also indicated that many students know little about AIDS. Surveys and opinion polls taken by various authorities indicated the need for education to allay the misconceptions and fears that exist in society. These same surveys and polls indicated that the general public has a genuine thirst for education that would give them specific information about AIDS, how it is transmitted, and the preventative measures that can be used to avoid the disease.

An evaluation of the effectiveness of health education in public schools indicated that health issues discussed in the classroom do effect change in student attitudes, knowledge, and lifestyles that are conducive to healthier living. This indicated that measureable success can be accomplished in reducing the spread of AIDS by educating youth about AIDS. The research indicated that this fact becomes especially important since half (10 million) of all sexually transmitted diseases occur in people below the age of 25.

World, national, and state health authorities as well as the scientific community and local leaders presented evidence that supports

their urgent calls for educational programs and massive public information campaigns to inform the public about AIDS. The research indicated that many health authorities believe that the "education as prevention" philosophy should be adopted because education is the only tool available to fight the spread of AIDS since there is no cure for the disease. By implementing AIDS curriculums in schools and running massive public information campaigns, authorities indicated this could help control the spread of AIDS.

The research indicated that if teachers are to effectively teach students about AIDS in the classroom they need to know the biological nature of the virus, the specific modes by which it can be transmitted, and the means that can be used to prevent the transmission of the HIV. Teachers need to strive to ensure that students understand AIDS well in order to carry out the obligation of protecting the health and well-being of the student.

RECOMMENDATIONS

It is recommended that:

1. Schools adopt an effective AIDS curriculum and implement it into the junior and senior high school and as many of the lower grades as would seem advisable.

2. Schools contribute to the education of the public by sponsoring informative programs about AIDS for administrators, teachers, other school personnel, parents, and the community.

3. Life science teachers become familiar with the biological nature of the HIV to be able to effectively discuss it and the disease it causes.

4. All educators who present AIDS curriculums in the classroom become familiar with how the HIV is transmitted and how its transmission can be prevented. To help students understand the subject, educators use whatever vernacular is necessary to explain the specific modes of transmission and methods of prevention to them.

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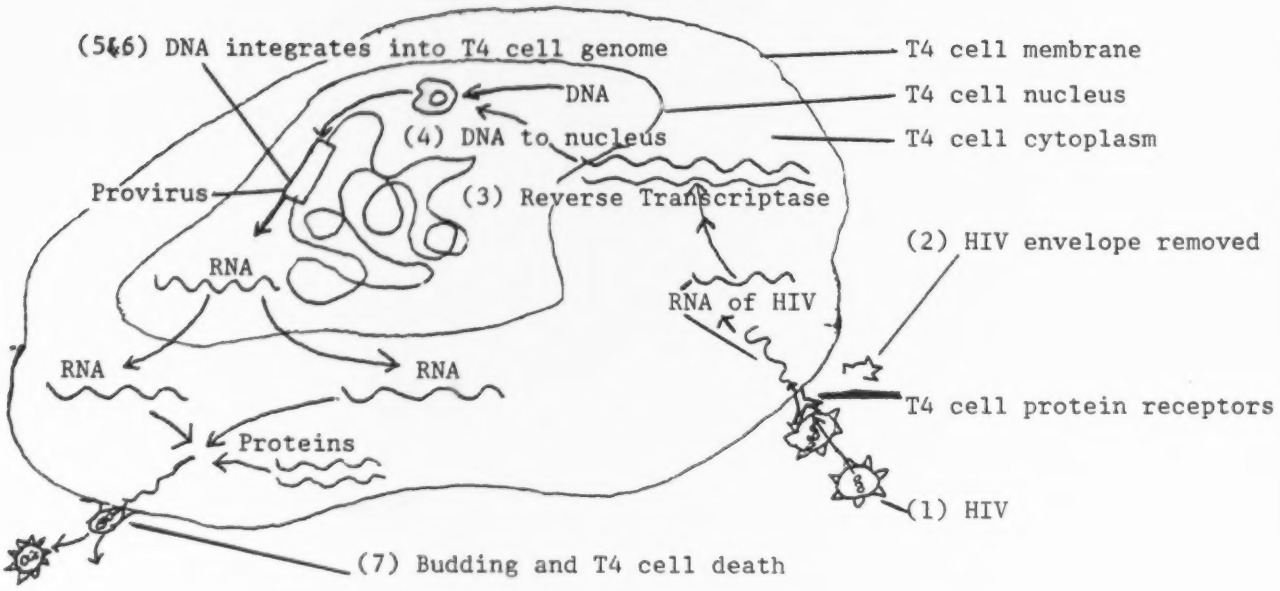
APPENDIX A

LIFE CYCLE OF THE HIV



HIV

The life cycle of the HIV can be illustrated using the following steps:

(1) The HIV attaches to the protein receptor of the T4 cell.
(2) The envelope is removed from the virus.
(3) The single-stranded viral RNA penetrates the T4 cell membrane; and once in the cytoplasm of the T4 cell, the RNA is transcribed into double-stranded DNA by using reverse transcriptase.
(4) The DNA enters the nucleus of the T4 cell where it integrates itself ino the host cell genome.
(5) The integrated viral DNA is now called a provirus.
(6) In some cases the provirus remains dormant or unexpressed. In other cases it is transcribed into viral RNA, leading to the production of viral proteins and the formation of new HIV particles.
(7) These progeny are released by budding from the cell membrane. While budding from the T4 cell, the membrane of the T4 cell bursts and its cytoplasm escapes which causes the T4 cell to die (this process causing cell death is known as death by cell lysis).

Source: Institute of Medicine/National Academy of Sciences:(63) Adapted.

APPENDIX B

Acquired immunodeficiency syndrome (AIDS) cases reported, by transmission category, by year, and with percentage of yearly increases- United States, through December 8, 1986. Source: Centers for Disease Control:(35:49:759).

*Includes persons without other identified risks who were born in countries in which heterosexual transmission is believed to play a major role although precise means of transmission are not known.

Transmission category	Before 12/8/82 No.	12/9/82-12/8/83 No.	(%Inc)	12/9/83-12/8/84 No.	(%Inc)	12/9/84-12/8/85 No.	(%Inc)	12/9/85-12/8/86 No.	(%Inc)	Total
Adult Male:										
Homosexual/bisexual only	562	1,252	(123)	2,720	(117)	5,306	(95)	8,322	(57)	18,162
IV drug user only	98	295	(201)	561	(90)	1,132	(102)	1,674	(48)	3,760
Both homosexual/IV drug user	74	194	(162)	396	(104)	576	(45)	925	(61)	2,165
Hemophilia/coagulation disorder	6	11	(83)	31	(182)	66	(113)	119	(80)	233
Other heterosexual contact										
Sexual contact	1	1	(0)	10	(900)	20	(100)	49	(145)	81
Non-U.S. born*	40	68	(70)	96	(41)	111	(16)	146	(32)	461
Transfusion	1	14	(1300)	28	(100)	96	(243)	185	(93)	324
Undetermined	16	51	(219)	81	(59)	158	(95)	342	(116)	648
Male subtotal	798	1,886	(136)	3,923	(108)	7,465	(90)	11,762	(58)	25,834
Adult female:										
IV drug user only	26	79	(204)	152	(92)	276	(82)	430	(56)	963
Hemophilia/coagulation disorder	0	0	-	2	-	2	(0)	3	(50)	7
Other heterosexual contact										
Sexual contact	7	20	(186)	47	(135)	100	(113)	200	(130)	404
Non-U.S. born*	9	12	(33)	13	(8)	31	(138)	45	(45)	110
Transfusion	2	12	(500)	20	(67)	57	(185)	90	(58)	181
Undetermined	7	17	(143)	24	(41)	65	(171)	92	(42)	205
Female subtotal	51	140	(175)	258	(84)	531	(106)	890	(68)	1,870
Adult subtotal	849	2,026	(139)	4,181	(106)	7,996	(91)	12,652	(58)	27,704
Pediatric	1	41	(4,000)	50	(22)	124	(148)	178	(44)	394
Total	850	2,067	(143)	4,231	(105)	8,120	(92)	12,830	(58)	28,098

APPENDIX C

Acquired immunodeficiency syndrome cases, by date of report, and doubling time- United States, through December 8, 1986. Source: Centers for Disease Control:(35:49:757).

Cumulative cases reported	Date*	Doubling time* (months)
110	September 1981	-
220	January 1982	5
439	June 1982	6
878	December 1982	6
1,756	July 1983	7
3,512	February 1984	8
7,025	December 1984	9
14,049	October 1985	11
28,098	December 1986	13

*Doubling time was calculated in days but is reported here to nearest month.

APPENDIX D

AIDS IN INDIANA BY STATE AND COUNTY

PROVISIONAL

AIDS MORBIDITY

AND MORTALITY

BY COUNTY

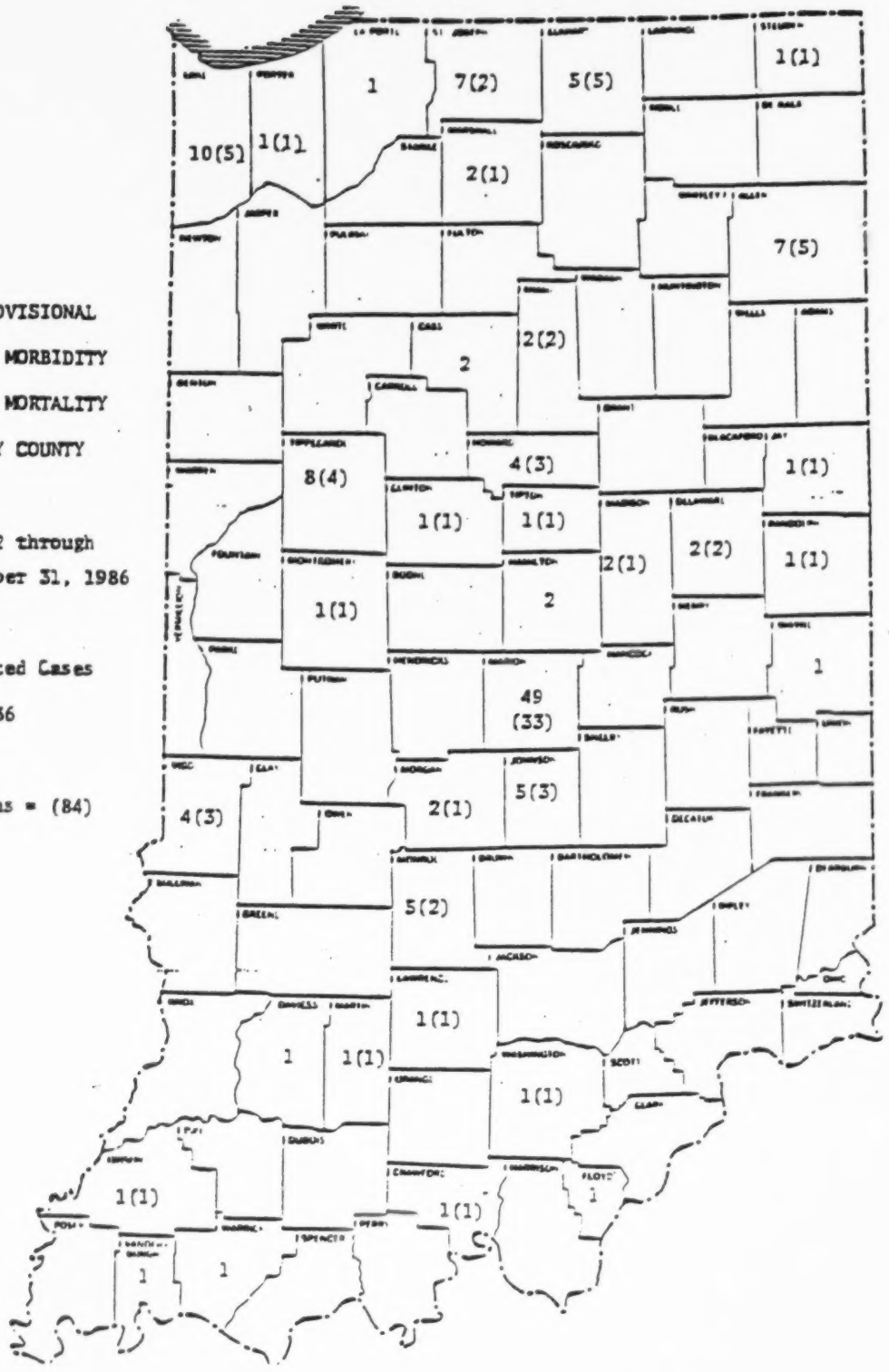
1982 through

December 31, 1986

Reported Cases

= 136

Deaths = (84)

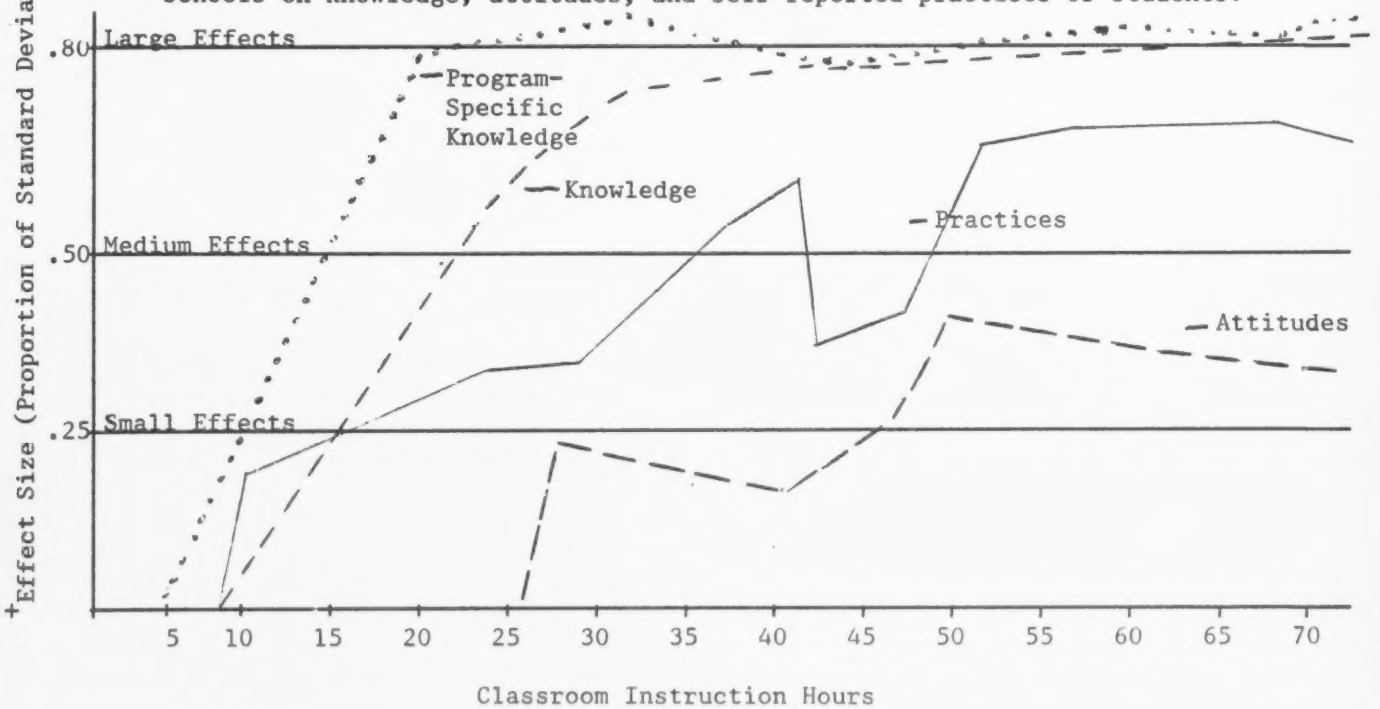


Source: Centers for Disease Control Reprint. ISBH (B-3).

APPENDIX E

Relationship of effect size and instruction hours for health knowledge, attitudes, and practices. Source: Centers for Disease Control (35:38:594).

School Health Education Evaluation (SHEE) conducted from 1982 through 1984 using over 30,000 fourth through seventh-grade students from 1,071 classrooms in 20 states to determine the effectiveness of health education curricula in schools on knowledge, attitudes, and self-reported practices of students:



+Effect sizes computed as the difference between program and comparison test scores divided by the pooled standard deviation for those classrooms.

*Effect size reflects the educational importance of levels reached.

*Large effects on specific program knowledge were achieved in relatively few classroom hours, while more than 50 hours were required to achieve large effects in general knowledge.

*Medium effects for self-reported practices were first achieved within 30 hours of instruction, but 50 hours were needed to reach a stable level.

*Only small effects on attitudes were demonstrated, even after 50 hours of instruction.

*Overall, children exposed to health education showed increased knowledge, healthier attitudes, and better health skills and practices than those who did not receive health education.

APPENDIX F

McCormick, Kathleen, "More Help for Your Fight Against AIDS," The American School Board Journal, 194:3:28, March 1987.

McCormick claimed, "Adolescents are considered especially vulnerable to the risk of AIDS infection. School people are being called upon to establish school programs to teach students about how to prevent getting and spreading the fatal disease." McCormick suggested that teachers send for information about AIDS from any of the following resources:

GENERAL INFORMATION-

Surgeon General's Report on Acquired immune Deficiency Syndrome.
AIDS
P.O. Box 14252
Washington, D.C. 20044

AIDS and Children: Information for Teachers and School Officials-
AIDS and Children: Information for Parents of School-age Children.
Free from Inter-America Research.

Confronting AIDS: Directions for Public Health, Health Care, and Research.
National Academy Press
2101 Constitution Ave. N.W.
Washington, D.C. 20418

AIDS and the Public Schools.
Research Support Services
National School Boards Association
1680 Duke St.
Alexandria, VA 22314

CURRICULUM-WRITING GUIDE-

Teaching AIDS, A Resource Guide on Acquired Immune Deficiency Syndrome.
Network Publications
1700 Mission St., Suite 203
P.O. Box 1830
Santa Cruz, CA 95861-1830

EXISTING CURRICULUMS-

Family Living Including Sex Education-Supplementary; Material Related to AIDS.
New York City Board of Education
Office of Health&Phys. Ed.
347 Baltic St.
Brooklyn, N.Y. 11201

AIDS: Acquired Immune Deficiency Syndrome.
Robert F. Adams, Supervisor
School Board of Dade County
Administraion Building
1450 N.E. 2nd Ave.
Miami, FL 33132